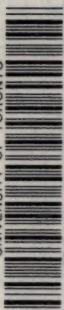


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CREATION OR EVOLUTION?

A PHILOSOPHICAL INQUIRY.

BY
GEORGE TICKNOR CURTIS.

NEW YORK:
D. APPLETON AND COMPANY,
1, 3, AND 5 BOND STREET.
1887.



CREATION

OR EVOLUTION

A PHILOSOPHICAL INQUIRY

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By GEORGE TICKNOR CURTIS.

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NEW YORK:
D. APPLETON AND COMPANY,
115 N. 3RD STREET.
1887.

TO
LEWIS A. SAYRE, M. D.,
WHOSE PROFESSIONAL EMINENCE IS RECOGNIZED
IN BOTH HEMISPHERES,
WHOSE SKILL AS A SURGEON
SUFFERING HUMANITY GRATEFULLY ACKNOWLEDGES,
TO WHOSE ANATOMICAL LEARNING
THE AUTHOR IS LARGELY INDEBTED,
AND OF WHOSE FRIENDSHIP HE IS PROUD,

This Book
IS AFFECTIONATELY INSCRIBED.

*“Dost thou not know, my new astronomer!
Earth, turning from the sun, brings night to man?
Man, turning from his God, brings endless night;
Where thou canst read no morals, find no friend,
Amend no manners, and expect no peace.”*

YOUNG'S NIGHT THOUGHTS.

PREFACE.

PERHAPS it is expected of a writer who steps out of the sphere of his ordinary pursuits, and deals with such a subject as that which is treated in this work, that he will account for his so doing. It is not necessary for me to say that no class of men can have a monopoly in any subject. But I am quite willing to take my readers into my confidence so far as to state how I came to write this book.

Most men, who have a special pursuit, find the necessity for recreation of some kind. Some take it in one way, and some in another. It has been my habit through life to seek occasional relief from the monotony of professional vocations in intellectual pursuits of another character. Having this habit—which I have found by experience has no tendency to lessen one's capacity for the duties of a profession, or one's relish of its occupations—I some years ago took up the study of the modern doctrine of animal evolution. Until after the death of the late Mr. Charles Darwin, I had not given a very close attention to this subject. The honors paid to his memory, and due to his indefatigable research and extensive knowledge, led me to examine his "Descent of Man" and his "Origin of Species," both of

which I studied with care, and I trust with candor. I was next induced to examine the writings of Mr. Herbert Spencer on the subject of evolution, with which I had also been previously unacquainted except in a general way. I was a good deal surprised at the extent of Mr. Spencer's reputation as a thinker, and by the currency which his peculiar philosophy has had in this country, where it has led, among the young and inexperienced, as well as among older persons, to very incorrect habits of reasoning on subjects of the highest importance. The result of my studies of these writers is the present book. I have written it because I have seen, or believe that I have seen, where the conflict arises between some of the deductions of modern science and the principles which ought to regulate not only religious belief, but belief in anything that is not open to the direct observation of our senses. But I trust that I shall not be understood as having written for the purpose of specially defending the foundations of religious belief. This is no official duty of mine. How theologians manage, or ought to manage, the argument which is to convince men of the existence and methods of God, it is not for me to say. But a careful examination of the new philosophy has convinced me that those who are the special teachers of religious truth have need of great caution in the admissions or concessions which they make, when they undertake to reconcile some of the conclusions of modern scientists with belief in a Creator. I do not here speak of the Biblical account of the creation, but I speak of that belief in a Creator which is to be deduced from the phenomena of nature. While there are naturalists, scientists,

and philosophers at the present day, whose speculations do not exclude the idea of a Supreme Being, there are others whose theories are entirely inconsistent with a belief in a personal God, the Creator and Governor of the universe. Moreover, although there are great differences in this respect between the different persons who accept evolution in some form, the whole doctrine of the development of distinct species out of other species makes demands upon our credulity which are irreconcilable with the principles of belief by which we regulate, or ought to regulate, our acceptance of any new matter of belief. The principles of belief which we apply in the ordinary affairs of life are those which should be applied to scientific or philosophical theories; and inasmuch as the judicial method of reasoning upon facts is at once the most satisfactory and the most in accordance with common sense, I have here undertaken to apply it to the evidence which is supposed to establish the hypothesis of animal evolution, in contrast with the hypothesis of special creations.

I am no ecclesiastic. I advance no arguments in favor of one or another interpretation of the Scriptures about which there is controversy among Christians. While I firmly believe that God exists, and that he has made a revelation to mankind, whereby he has given us direct assurance of immortality, I do not know that this belief disqualifies me from judging, upon proper principles of evidence, of the soundness of a theory which denies that he specially created either the body or the mind of man. How far the hypothesis of evolution, by destroying our belief that God specially created us, tends to negative any purpose for

which we can suppose him to have made to us a revelation of our immortality, it is for the theologian to consider. For myself, I am not conscious that in examining the theory of evolution I have been influenced by my belief in what is called revealed religion. I have, at all events, studiously excluded from the argument all that has been inculcated by the Hebrew or the Christian records as authorized or inspired teachings, and have treated the Mosaic account of the creation like any other hypothesis of the origin of man and the other animals. The result of my study of the hypothesis of evolution is, that it is an ingenious but delusive mode of accounting for the existence of either the body or the mind of man; and that it employs a kind of reasoning which no person of sound judgment would apply to anything that might affect his welfare, his happiness, his estate, or his conduct in the practical affairs of life.

He who would truly know what the doctrine of evolution is, and to what it leads, must literally begin at the beginning. He must free his mind from the cant of agnosticism and from the cant of belief. He must refuse to accept dogmas on the authority of any one, be they the dogmas of the scientist, or of the theologian. He must learn that his mental nature is placed under certain laws, as surely as his corporeal structure; and he must cheerfully obey the necessities which compel him to accept some conclusions and to reject others. Keeping his reasoning powers in a well-balanced condition, he must prove all things, holding fast to that which is in conformity with sound deduction, and to that alone. But all per-

sons may not be able to afford the time to pursue truth in this way, or may not have the facilities for the requisite research. It seemed to me, therefore, that an effort to do for them what they can not do for themselves would be acceptable to a great many people.

It may be objected that the imaginary philosopher whom I have introduced in some of my chapters under the name of Sosphereus, or the searcher after wisdom, debating the doctrines of evolution with a supposed disciple of that school, whom I have named Kosmos, is an impossible person. It may perhaps be said that the conception of a man absolutely free from all dogmatic religious teaching, from all bias to any kind of belief, and yet having as much knowledge of various systems of belief as I have imputed to this imaginary person, would in modern society be the conception of an unattainable character. My answer to this criticism would be that I felt myself at liberty to imagine any kind of character that would suit my purpose. How successfully I have carried out the idea of a man in mature life entirely free from all preconceived opinions, and forming his beliefs upon principles of pure reason, it is for my readers to judge. With regard to the other interlocutor in the dialogues, I hope it is not necessary for me to say that I do not impute all of his opinions or arguments to the professors of the evolution school, or to any section of it. He is a representative of the effects of some of their teachings, but not an individual portrait. But as, for the purposes of the antagonism, it was expedient to put into the mouth of this person whatever can be said in favor of the hypothesis of

evolution, it became necessary to make him represent the dogmatic side of the theory; and thus to make the collision and contrast between the minds of the two debaters as strong as I could. Controversial discussion in the form of debate has been used from the time of Plato. While I have adopted a method, I have not presumed to imitate its great exemplars. But for the value of that method I shall presently cite weighty testimony. It was a relief to me to resort to it after having pursued the subject in the more usual form of discussion; and indeed it forced itself upon me as a kind of necessity, because it seemed the fairest way of presenting what could be said on both sides of the question. I hope it may have the good fortune to keep alive the interest of the reader, after he has perused the previous chapters.

One disadvantage of all positive writing or discourse is that there is no one to confute, to contradict, or to maintain the negative. At the bar, and in some public assemblies, there is an antagonist; and truth is elicited by the collision. But in didactic writing, especially on a philosophical topic, it is best to introduce an antagonist, and to make him speak in his own person. Two of the best thinkers of our time have forcibly stated the advantage—the necessity, in short—of personal debate. Mr. John Stuart Mill, in his essay on Liberty, observes that—

“The loss of so important an aid to the intelligent and living apprehension of a truth as is afforded by the necessity of explaining it to or defending it against opponents, though not sufficient to outweigh, is no trifling

drawback from the benefits of its universal recognition. Where this advantage can not be had, I confess I should like to see the teachers of mankind endeavoring to provide a substitute for it; some contrivance for making the difficulties of the question as present to the learner's consciousness as if they were pressed upon him by a dissentient champion eager for his conversion.

“But instead of seeking contrivances for this purpose, they have lost those they formerly had. The Socratic dialectics, so magnificently exemplified in the dialogues of Plato, were a contrivance of this description. They were essentially a discussion of the great questions of life and philosophy, directed with consummate skill to the purpose of convincing any one, who had merely adopted the commonplaces of received opinion, that he did not understand the subject—that he as yet attached no definite meaning to the doctrines he professed, in order that, becoming aware of his ignorance, he might be put in the way to attain a stable belief, resting on a clear apprehension both of the meaning of doctrines and of their evidence. The school disputations of the middle ages had a similar object. They were intended to make sure that the pupil understood his own opinion, and (by necessary correlation) the opinion opposed to it, and could enforce the grounds of one and confute those of the other. The last-mentioned contests had, indeed, the incurable defect that the premises appealed to were taken from authority, not from reason; and as a discipline to the mind they were in every respect inferior to the powerful dialectics which formed the intellects of the ‘Socratici viri.’ But

the modern mind owes far more to both than it is generally willing to admit; and the present modes of instruction contain nothing which in the smallest degree supplies the place either of the one or of the other. . . . It is the fashion of the present time to disparage negative logic—that which points out weakness in theory or errors in practice, without establishing positive truths. Such negative criticism would indeed be poor enough as an ultimate result, but as a means to attaining any positive knowledge or conviction worthy the name, it can not be valued too highly; and until people are again systematically trained to it there will be few great thinkers, and a low general average of intellect in any but the mathematical and physical departments of speculation. On any other subject no one's opinions deserve the name of knowledge, except so far as he has either had forced upon him by others, or gone through of himself, the same mental process which would have been required of him in carrying on an active controversy with opponents.”

Mr. Grote, in his admirable work on “Plato and the other Companions of Socrates,” has the following passage:

“Plato is usually extolled by his admirers as the champion of the Absolute—of unchangeable forms, immutable truth, objective necessity, cogent and binding on every one. He is praised for having refuted Protagoras, who can find no standard beyond the individual recognition and belief of his own mind or that of some one else. There is no doubt that Plato often talks in that strain, but the method followed in his dialogues, and the general principles of methods which he lays down here as well as

elsewhere, point to a directly opposite conclusion. Of this the Phædrus is a signal instance. Instead of the extreme of generality, it proclaims the extreme of speciality. The objection which the Socrates of the Phædrus advances against the didactic efficacy of written discourse is founded on the fact that it is the same to all readers—that it takes no cognizance of the differences of individual minds nor of the same mind at different times. Socrates claims for dialectic debate the valuable privilege that it is constant action and reaction between two individual minds—an appeal by the inherent force and actual condition of each to the like elements in the other—an ever-shifting presentation of the same topics, accommodated to the measure of intelligence and cast of emotion in the talkers and at the moment. The individuality of each mind—both questioner and respondent—is here kept in view as the governing condition of the process. No two minds can be approached by the same road or by the same interrogation. The questioner can not advance a step except by the admission of the respondent. Every respondent is the measure to himself. He answers suitably to his own belief; he defends by his own suggestions; he yields to the pressure of contradiction and inconsistency *when he feels them*, and not before. Each dialogist is (to use the Protagorean phrase) the measure to himself of truth and falsehood, according as he himself believes it. Assent or dissent, whichever it may be, springs only from the free working of the individual mind in its actual condition then and there. It is to the individual mind alone that appeal is made, and this is what Protagoras asks for.

“We thus find, in Plato’s philosophical character, two extreme opposite tendencies and opposite poles co-existent. We must recognize them both, but they can never be reconciled ; sometimes he obeys and follows the one, sometimes the other.

“If it had been Plato’s purpose to proclaim and impose upon every one something which he called ‘Absolute Truth,’ one and the same alike imperative upon all, he would best proclaim it by preaching or writing. To modify this ‘Absolute,’ according to the varieties of the persons addressed, would divest it of its intrinsic attribute and excellence. If you pretend to deal with an Absolute, you must turn away your eyes from all diversity of apprehending intellects and believing subjects.”

With such testimony to the value of dialectic debate, I hope that my adoption of it as a method will be regarded as something better than an affectation.

Mr. Spencer, in one of his works,* referring to and quoting from Berkeley’s “Dialogues of Hylas and Philolaus,” observes that “imaginary conversation affords great facilities for gaining a victory. When you can put into an adversary’s mouth just such replies as suit your purpose, there is little difficulty in reaching the desired conclusion.” I have not written to gain a victory ; and, indeed, I am quite aware that it would be impossible to gain one over those with whom I can have no common ground of reasoning. In the imaginary conversations in this work, I have taken great care not to put into the

* “Principles of Psychology,” vol. i, p. 326.

mouth of the supposed representative of the doctrine of evolution anything that would suit my own purpose ; and, in every instance in which I have represented him as relying on the authority of Mr. Darwin or of Mr. Spencer, I have either made him quote the words or have made him state the positions as I suppose they must be understood, and have referred the reader to the proper page in the works of those writers.

And here I will render all honor to the admirable candor with which Mr. Darwin discussed objections to his theory which have been propounded by others, and suggested further difficulties himself. If I do not pay the same tribute to Mr. Spencer, the reason will be found in those portions of my work in which I have had occasion to call in question his methods of reasoning.

Some repetition of facts and arguments will be found in the following pages in the different aspects in which the subject is treated. This has been intentional. When the tribunal that is addressed is a limited and special one, and is composed of a high order of minds accustomed to deal with such a science, for example, as jurisprudence, he who undertakes to produce conviction can afford to use condensation. He seldom has to repeat what he has once said ; and often, the more compact his argument, the more likely it will be to command assent if it is clear as well as close. But this work is not addressed to such a tribunal. It is written for various classes of readers, some of whom have already a special acquaintance with the subject, some of whom have less, and some of whom have now none at all. It is designed to explain what the theory

of evolution is, and to encounter it in the mode best adapted to reach the various minds of which the mass of readers is composed. If I had written only for scientists and philosophers, I should not have repeated anything.

For similar reasons I have added to this volume both a general index and a glossary of the scientific and technical terms which I have had occasion to use.

The whole of the text of this work had been written and electrotyped before I had an opportunity to see the very interesting "Life and Correspondence" of the illustrious naturalist, the late Louis Agassiz, edited by his accomplished widow, Mrs. Elizabeth Cary Agassiz, and published in October, 1885, by Houghton, Mifflin and Company, Boston. For a long period of years, after his residence in this country began, and until my removal from Boston to New York in 1862, I enjoyed as much of his intimacy as would be likely to subsist between persons of such different pursuits. I believe that I understood his general views of creation, from his lectures and conversation. It is now made entirely certain that he never accepted the doctrine of evolution of distinct types out of preceding and different types by ordinary generation; and it has been to me an inexpressible satisfaction to find that the opinions and reasoning contained in my work, and adopted independently of any influence of his, are confirmed by what has now been given to the world. I need only refer to his letter to Prof. Sedgwick, written in June, 1845, and to his latest utterance, the paper on "Evolution and Permanence of Type," in the thirty-third volume of the "Atlantic Monthly," published after his lamented

death in 1873, for proof that his opinions on the Darwinian theory never changed. Of all the scientists whom I have ever known, or whose writings I have read, Agassiz always seemed to me the broadest as well as the most exact and logical reasoner.

NEW YORK, *September, 1886.*

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CREATION OR EVOLUTION?

CHAPTER I.

Nature and importance of the subject—Is there a relation of Creator and creature between God and man?—Rules of rational belief—Is natural theology a progressive science?

MAN finds himself in the universe a conscious and thinking being. He has to account to himself for his own existence. He is impelled to this by an irresistible propensity, which is constantly leading him to look both inward and outward for an answer to the questions: What am I? How came I to be? What is the limit of my existence? Is there any other being in the universe between whom and myself there exists the relation of Creator and creature?

The whole history of the human mind, so far as we have any reliable history, is marked by this perpetual effort to find a First Cause.

However wild and fantastic may be the idea which the savage conceives of a being stronger and wiser than himself; however groveling and sensual may be his conception of the form, or attributes, or action of that being, he is, when he strives after the comprehension of his deity, engaged in the same intellectual effort that is made by the most civilized and cultivated of mankind, when, speculating upon the origin of the human soul, or its relation to the universe, or the genesis of the material world, they reach the sublime conception of an infinite God, the creator

of all other spiritual existences and of all the forms of animal life, or when they end in the theory that there is no God, or in that other theory which supposes that what we call the creation, man included, is an evolution out of primordial matter, which has been operated upon by certain fixed laws, without any special interposition of a creating power, exerted in the production of the forms of animal life that now inhabit this earth, or ever have inhabited it. In the investigation of these contrasted theories, it is necessary to remember that the faculties of the human mind are essentially the same in all conditions of civilization or barbarism ; that they differ only in the degree of their growth, activity, and power of reasoning, and therefore that there must be a common standard to which to refer all beliefs. The sole standard to which we can refer a belief in anything is its rationality, or a comparison between that which is believed and that which is most probable, according to the power of human reason to weigh probabilities. In the untutored and uncultivated savage, this power, although it exists, is still very feeble ; partly because it is exercised upon only a few objects, and partly because the individual has comparatively but little opportunity to know all the elements which should be taken into account in determining a question of moral probabilities.

In the educated and cultivated man this power of judging probabilities, of testing beliefs by their rationality, is carried, or is capable of being carried, to the highest point of development, so as to comprehend in the calculation the full elements of the question, or at least to reduce the danger of some fatal omission to the minimum. It is, of course, true that the limited range of our faculties may prevent a full view of all the elements of any question of probability, even when our faculties have attained the highest point of development experienced by the age in which we happen to live. This renders the rationality of any hy-

pothesis less than an absolutely certain test of truth. But this rationality is all that we have to apply to any question of belief ; and if we attend carefully to the fact that moral probabilities constitute the groundwork of all our beliefs, and note the mental processes by which we reach conclusions upon any question depending upon evidence, we shall find reason to regard this power of testing beliefs by a conformity between the hypotheses and that which is most probable to be the most glorious attribute of the human understanding, as it is unquestionably the safest guide to which we can trust ourselves.

It may be that, while philosophers will not object to my definition of rationality, churchmen will ask what place I propose to assign to authority in the formation of beliefs. I answer, in the first place, that I am seeking to make myself understood by plain but reflecting and reasoning people. Such persons will perceive that what I mean by the rationality of a belief in any hypothesis is its fitness to be accepted and acted upon because it has in its favor the strongest probabilities of the case, so far as we can grasp those probabilities. I know of no other foundation for a belief in anything ; for belief is the acceptance by the mind of some proposition, statement, or supposed fact, the truth of which depends upon evidence addressed to our senses, or to our intellectual perceptions, or to both. In the next place, in regard to the influence of authority over our beliefs, it is to be observed that the existence of the authority is a question to be determined by evidence, and this question, therefore, of itself involves an application of the test of rationality, or conformity with what is probable. But, assuming that the authority is satisfactorily established, it is not safe to leave all minds to the teaching of that authority, without the aid of the reasoning, which, independent of all authority, would conduct to the same conclusion. There are many minds to whom it is useless to say, You are com-

manded to believe. The question instantly arises, Commanded by whom, or what ? And if the answer is, By the Church, or by the Bible, and the matter is left to rest upon that statement, there is great danger of unbelief. It is apparent that a large amount of what is called infidelity, or unbelief, now prevailing in the world, is due to the fact that men are told that they are commanded to believe, as if they were to be passive recipients of what is asserted, and because so little is addressed to their understandings.

I do not wish to be understood as maintaining that there is no place for authority in matters of what is called religious belief. I am quite sensible that there may be such a thing as authority even in regard to our beliefs ; that it is quite within the range of possibilities that there should be such a relation between the human soul and an infinite Creator as to require the creature to accept by faith whatever a proved revelation requires that intelligent creature to believe. But, in view of the fact that what is specially called revealed religion is addressed to an intelligent creature, to whom the revelation itself must be proved by some evidence that will satisfy the mind, there is an evident necessity for treating the rationality of a belief in God as an independent question. In some way, by some process, we must reach a belief in the existence of a being before we can consider the claims of a message which that being is supposed to have sent to us. What we have to work with, before we can approach the teaching of what is called revealed religion, is the mind of man and the material universe. Do these furnish us with the rational basis for a belief in God ?

And here I shall be expected to say what I mean by a belief in God. I have neither so little reverence for what I myself believe in, nor so little respect for my readers, as to offer them anything but the common conception of God. All that is necessary for me to do, in order to put

my own mind in contact with that of the reader, is to express my conception of God just as it would be expressed by any one who is accustomed to think of the being called God by the Christian, the Jew, the Mohammedan, or by some other branches of the human race. These different divisions of mankind may differ in regard to some of the attributes of the Deity, or his dealings with men, or the history or course of his government of the world. But what is common to them all is a belief in God as the Supreme Being, who is self-existing and eternal, by whose will all things and all other beings were created, who is infinite in power and wisdom and in goodness and benevolence. As an intellectual conception, this idea of a Supreme Being, one only God, who never had a beginning and can have no end, and who is the creator of all other beings, excludes, of course, the polytheism of the ancient civilized nations, or that of the present barbarous tribes; and it especially excludes the idea of what the Greeks called *Destiny*, which was a power that governed the gods as well as the human race, and was anterior and superior to Jove himself. The simple conception of the one God held by the Christian, the Jew, or the Mohammedan, as the First Cause of the universe and all that it embraces, creating all things and all other beings by his will, in contrast with the modern idea that they came into existence without the volition of a conscious and intelligent being making special creations, is what I present to the mind of the reader.

This idea of God as a matter of belief presents, I repeat, a question of moral probabilities. The existence of the universe has to be accounted for somehow. We can not shut out this inquiry from our thoughts. The human being who never speculates, never thinks, upon the origin of his own soul, or upon the genesis of this wondrous frame of things external to himself, or upon his relations to some superior being, is a very rare animal. If he is

much more than an animal, he will have some idea of these things ; and the theories by which some of the most cultivated and acute intellects of our race, from the widest range of accumulated physical facts and phenomena yet gathered, have undertaken to account for the existence of species without referring them to the volition of an infinite creator, are at once a proof of the universal pressure of the question of creation upon the human mind, and of the logical necessity for treating it as a question dependent upon evidence and probability.

I lay out of consideration, now, the longing of the human mind to find a personal God and Creator. This sentiment, this yearning for an infinite father, this feeling of loneliness in the universe without the idea of God, is certainly an important moral factor in the question of probability ; but I omit it now from the number of proofs, because it is a sentiment, and because I wish to subject the belief in God as the Creator to the cold intellectual process by which we may discover a conformity between that hypothesis and the phenomena of Nature as a test of the probable truth. If such a conformity can be satisfactorily shown, and if the result of the process as conducted can fairly claim to be that the existence of God the Creator has by far the highest degree of probability above and beyond all other hypotheses that have been resorted to to account for our existence, the satisfaction of a moral feeling of the human heart may well become a source of happiness, a consolation in all the evils of this life, and a support in the hour of death.

But in this preliminary chapter I ought to state what I understand to be the scientific hypothesis or hypotheses with which I propose to contrast the idea of God as the creator of species by applying the test of probability. To discuss the superior claims of one hypothesis over another, without showing that there is a real conflict between them,

would be to set up a man of straw for the sake of knocking it down as if it were a living and real antagonist. What I desire to do is not to aim at a cheap victory by attacking something that does not call for opposition ; but it is to ascertain first whether there is now current any explanation or hypothesis concerning the origin of the creation, or anything that it contains, which rejects the idea of God as the creator of that which we know to exist and as it exists, and then to ascertain which of the two hypotheses ought to be accepted as the truth, because it has in its favor the highest attainable amount of probability. There is an amount of probability which becomes to us a moral demonstration, because our minds are so constituted that conviction depends upon the completeness with which the evidence in favor of one hypothesis excludes the other from the category of rational beliefs.

I pass by the common sort of infidelity which rejects the idea of an intelligent creator acting in any manner whatever, whether by special creations or by laws of development operating on some primordial form of animal life. But among the modern scientists who have propounded explanations of the origin of species, I distinguish those who do not, as I understand, deny that there was an intelligent Creator by whose will some form of animal life was originally called into being, but who maintain that the diversified forms of animal life which we now see were not brought into being by the special will of the Creator as we now know them, but that they were evolved, by a process called natural selection, out of some lower type of animated organism. Of this class, the late Mr. Darwin is a representative. There is, however, at least one philosopher who carries the doctrine of evolution much farther, and who, if I rightly understand him, rejects any act of creation, even of the lowest and simplest type of animal existence. This is Mr. Herbert Spencer—a writer who, while he concurs in

Mr. Darwin's general theory of natural selection as the process by which distinct organisms have been evolved out of other organisms, does not admit of any primal organism as the origin of the whole series of animals and as the creation of an intelligent will.

It will be appropriate hereafter to refer to the doctrine of evolution as a means of accounting for the existence of the human mind. At present it is only necessary to say that I understand it to be maintained as the hypothesis which has the highest attainable amount of evidence in its favor, that distinct species of animals are not a creation but a growth; and also that the mind of man is not a special creation of a spiritual existence, but a result of a long process by which organized matter has slowly worked itself from matter into intellect. Wherever, for instance, these scientists may place the non-human primate, out of which man has been evolved by what is called natural selection, and whether they do or do not assume that he was a creation of an intelligent will, they do not, as I understand, claim that the primate was endowed with what we call intellect; so that at some time there was a low form of animal life without intellect, but intellect became evolved in the long course of countless ages, by the process of natural selection, through the improving conditions and better organization of that low animal which had no intellect. In other words, we have what the scientist calls the non-human primate, a low form of animal without intellect, but capable of so improving its own physical organization as to create for itself and within itself that essence which we recognize as the human mind. Here, then, there is certainly a theory, an hypothesis, which may be and must be contrasted with the idea that the mind of man is a spiritual essence created by the volition of some other being having the power to create such existences, and put into a temporary union with a physical organization, by the establishment

of a mysterious connection which makes the body the instrument of the soul so long as the connection exists. If I have stated correctly the theory which assigns the origin of the human mind to the process of evolution, I have assuredly not set up a man of straw. I stand confronted with an hypothesis which directly encounters the idea that the human intellect is a creation, in the sense of a direct, intelligent, conscious, and purposed production of a special character, as the human mind and hand, in the production of whatever is permitted to finite capacities, purposely creates some new and independent object of its wishes, its desires, or its wants. The human mind, says the scientist, was not created by a spiritual being as a spiritual existence independent of matter, but it grew out of matter, that was at first so organized that it did not manifest what we call intellect, but that could so improve its own organization as to evolve out of matter what we know as mind.

And here I lay out of view entirely the comparative dignity of man as a being whose existence is to be accounted for by the one hypothesis or the other, because this comparative dignity is not properly an element in the question of probability. The doctrine of evolution, as expounded by Darwin and other modern scientists, may be true, and we shall still have reason to exclaim with Hamlet, "What a piece of work is man!"

On the other hand, the hypothesis that man is a special creation of an infinite workman, if true, does not enhance the mere *a priori* dignity of the human race. It may, and it will hereafter appear that it does, establish the moral accountability of man to a supreme being, a relation which, if I correctly understand the doctrine of evolution, is left out of the system that supposes intellect to be evolved out of the improving process by which matter becomes nervous organization, whose action exhibits those manifestations which we call mind. The moral accountability of

man to a supreme being may, if it becomes established by proper evidence, be a circumstance that distinguishes him from other animals, and may, therefore, raise him in the scale of being. But then this dignity is a fact that comes after the process of reasoning has shown the relation of creator and creature, and it should not be placed at the beginning of the process among the proofs that are to show that relation. Mr. Darwin, in concluding his great work, "The Descent of Man," which he maintains to have been from some very low type of animated creature, through the apes, who became our ancestors, and who were developed into the lowest savages, and finally into the civilized man, has anticipated that his theory will, he regrets to say, be "highly distasteful to many"; and he adds, by way of parrying this disgust, that "he who has seen a savage in his native land will not feel much shame if forced to acknowledge that the blood of some more humble creature flows in his veins." For his own part, he adds, he would as soon be descended from a certain heroic little monkey who exposed himself to great danger in order to save the life of his keeper, as from a savage who delights to torture his enemies, offers bloody sacrifices, practices infanticide, etc. Waiving for the present the question whether the man who is called civilized is necessarily descended from or through the kind of savage whom Mr. Darwin saw in the Tierra del Fuego, or whether that kind of savage is a deteriorated offshoot from some higher human creatures that possessed moral and intellectual characteristics of a more elevated nature, I freely concede that this question of the dignity of our descent is not of much logical consequence. However distasteful to us may be the idea that we are descended from the same stock as the apes, and that their direct ancestors are to be traced to some more humble creature until we reach the lowest form of organized and animated matter, the dignity of our human nature is not to be reckoned

among the probabilities by which our existence is to be accounted for. It is, in this respect, like the feeling or sentiment which prompts us to wish to find an infinite creator, the father of our spirits and the creator of our bodies. As a matter of reasoning, we must prove to ourselves, by evidence that satisfies the mind, that God exists. Having reached this conviction, the belief in his existence becomes a vast and inestimable treasure. But our wish to believe in God does not help us to attain that belief. In the same way our feeling about the dignity of man, the nobleness or ignobleness of our descent from or through one kind of creature or another, may be a satisfaction or a dissatisfaction after we have reached a conclusion, but it affords us no aid in arriving at a satisfactory conclusion from properly chosen premises.

And here, in advance of the tests which I shall endeavor to apply to the existence of God and the existence of man as a special creation, I desire to say something respecting the question of a logical antagonism between science and religion. I have often been a good deal puzzled to make out what those well-meaning persons suppose, who unwarily admit that there is no necessary antagonism between what modern science teaches and what religion teaches. Whether there is or is not, depends upon what we mean by science and religion. If by science we understand the investigation of Nature, or a study of the structure and conditions of everything that we can subject to the observation of our senses, and the deduction of certain hypotheses from what we observe, then we must compare the hypotheses with the teachings or conclusions which we derive from religion. The next question, therefore, is, What is religion? If we make it to consist in the Mosaic account of the creation, or in the teachings of the Bible respecting God, we shall find that we have to deal with more or less of conflict between the interpretations that are put upon a record sup-

posed to have been inspired, and the conclusions of science. But if we lay aside what is commonly understood by revealed religion, which supposes a special communication from a superior to an inferior being of something which the former desires the latter to know, after the latter has been for some time in existence, then we mean by religion that belief in the existence of a superior being which we derive from the exercise of our reasoning powers upon whatever comes within the observation of our senses, and upon our own intellectual faculties. In other words, for what we call natural religion, we look both outward and inward, in search of a belief in a Supreme Being. We look outward, because the whole universe is a vast array of facts, from which conclusions are to be drawn; and among this array of facts is the construction of our bodies. We look inward, because our own minds present another array of facts from which conclusions are to be drawn. Now, if the conclusions which the scientist draws from the widest observation of Nature, including the human mind itself, fail to account for the existence of the mind of man, and natural religion does account for it, there is an irreconcilable conflict between science and religion. I can not avoid the conviction that Mr. Darwin has missed the point of this conflict. "I am aware," he says, "that the conclusions arrived at in this work will be denounced by some as highly irreligious; but he who denounces them is bound to show why it is more irreligious to explain the origin of man, as a distinct species by descent from a lower form, through the laws of variation and natural selection, than to explain the birth of the individual through the laws of ordinary reproduction." I do not understand him, by the terms "religious" or "irreligious," to refer to anything that involves praise or blame for adopting one hypothesis rather than another. I suppose he meant to say that a belief in his theory of the descent of

man as a species is no more inconsistent with a belief in God than it is to believe that the individual is brought into being through the operation of the laws of ordinary reproduction which God has established. This would be strictly true, if the hypothesis of man's descent as a distinct species from some lower form accounted for his existence by proofs that satisfy the rules of evidence by which our beliefs ought to be and must be determined. In that case, there would be no inconsistency between his hypothesis and that to which natural religion conducts us. On the other hand, if the Darwinian hypothesis fails to establish a relation between the soul of man, as a special creation, and a competent creator, then the antagonism between this hypothesis and natural religion is direct, immediate, and irreconcilable ; for the essence of religion consists in that relation, and a belief in that relation is what we mean, or ought to mean, by religion.

There is another form in which Mr. Darwin has depreciated the idea of any antagonism between his theory and our religious ideas, but it has the same logical defect as the suggestion which I have just considered, because it involves the same assumption. It is put hypothetically, but it is still an assumption, lacking the very elements of supreme probability that can alone give it force. "Man," he observes, "may be excused for feeling some pride at having risen, not through his own exertions, to the very summit of the organic scale ; and the fact of his having so risen, instead of being aboriginally placed there, may give him some hope for a still higher destiny in the distant future." I certainly would not misrepresent, and I earnestly desire to understand, this distinguished writer. It is a little uncertain whether he here refers to the hope of immortality, or of an existence after the connection between our minds and our bodies is dissolved, or whether he refers to the further elevation of man on this earth in the distant future of terres-

trial time. If he referred to the hope of an existence after what we call death, then he ought to have shown that his theory is compatible with such a continued existence of the soul of man. It will be one of the points on which I propose to bestow some attention, that the doctrine of evolution is entirely incompatible with the existence of the human soul for one instant after the brain has ceased to act as an organism, and death has wholly supervened ; because that doctrine, if I understand it rightly, regards the intellect of man as a high development of what in other animals is called instinct, and instinct as a confirmed and inherited habit of animal organism to act in a certain way. If this is a true philosophical account of the origin and nature of intellect, it can have no possible individual existence after the organ called the brain, which has been in the habit of acting in a certain way, has perished, any more than there can be a digestion of food after the stomach or other assimilating organ has been destroyed. If, on the contrary, the mind of man is a special creation, of a spiritual essence, placed in an intimate union with the body for a temporary period, and made to depend for a time on the organs of that body as its means of manifestation and the exercise of its spiritual faculties, then it is conceivable that this union may be severed and the mind may survive. Not only is this conceivable, but, as I shall endeavor hereafter to show, the proof of it rises very high in the scale of probability—so high that we may accept it as a fact, just as confidently as we accept many things of which we can not have absolute certainty.

And here I think it needful, although not for all readers, but for the great majority, to lay down as distinctly as I can the rules of evidence which necessarily govern our beliefs. I do so because, in reading the works of many of the modern scientists who have espoused the Darwinian doctrine of evolution, I find that the rules of evidence are

but little observed. There is a very great, often an astonishingly great, accumulation of facts, or of assumed facts. It is impossible not to be impressed by the learning, the industry, and the range of these writers. Nor would I in the least impugn their candor, or question their accuracy as witnesses of facts, which I am not competent to dispute if I were disposed to do so. But there is one thing for which I may suppose myself competent. I have through a long life been accustomed to form conclusions upon facts; and this is what every person does and must do who is asked to accept a new theory or hypothesis of any kind upon any subject.

Most of our beliefs depend upon what is called circumstantial evidence. There are very few propositions which address themselves to our belief upon one direct and isolated proof. We may class most of the perceptions of our senses among the simple and unrelated proofs which we accept without hesitation, although there is more or less of an unconscious and instantaneous process of reasoning, through which we pass before the evidence of our senses is accepted and acted upon. Then there are truths to which we yield an instant assent, because they prove themselves, as is the case with the mathematical or geometrical problems, as soon as we perceive the connection in the steps of the demonstration. Besides these, there are many propositions which, although they involve moral reasoning, have become axioms about which we do not care to inquire, but which we assume to have been so repeatedly and firmly established that it would be a waste of time to go over the ground again whenever they come up. But there is a very large class of propositions which address themselves to our belief, which do not depend on a single perception through our senses, and are not isolated facts, and are not demonstrable by mathematical truth, and are not axioms accepted because they were proved long ago, and have by

general consent been adopted into the common stock of ideas. The class of beliefs with which the rules of circumstantial evidence are concerned are those where the truth of the proposition, or hypothesis, is a deduction from many distinct facts, but the coexistence of which facts leads to the inevitable conclusion that the proposition or hypothesis is true. We can not tell why it is that moral conviction is forced upon us by the coexistence of certain facts and their tendency to establish a certain conclusion. All we know is, that our minds are so constituted that we can not resist the force of circumstantial evidence if we suffer our faculties to act as reason has taught them. But, then, in any given case, whether we ought to yield our belief in anything where we have only circumstantial evidence to guide us, there are certain rules to be observed. The first of these rules is, that every fact in a collection of proofs from which we are to draw a certain inference must be proved independently by direct evidence, and must not be itself a deduction from some other fact. This is the first step in the process of arranging a chain of moral evidence. There is a maxim in this branch of the law of evidence that you can not draw an inference from an inference. In other words, you can not infer a fact from some other fact, and then unite the former with two or more independent facts to make a chain of proofs. Every link in the chain must have its separate existence, and its existence must be established by the same kind and degree of evidence as if it were the only thing to be proved. The next rule is to place the several facts, when so proved, in their proper relation to each other in the group from which the inference is to be drawn. In circumstantial evidence a fact may be established by the most direct and satisfactory proofs, and yet it may have no relation to other facts with which you attempt to associate it. For example, suppose it to be proved that A on a certain occasion bought a cer-

tain poison, and that soon after B died of that kind of poison ; but it does not appear that A and B were ever seen together, or stood in any relation to each other. The fact that A bought poison would have no proper relation to the other fact that B died of that kind of poison. But introduce by independent evidence the third fact, that A knew B intimately, and then add the fourth fact, that A had a special motive for wishing B's death, you have some ground for believing that A poisoned B, although no human eye ever saw the poison administered. From this correlation of all the facts in a body of circumstantial evidence, there follows a third rule, namely, that the whole collection of facts, in order to justify the inference sought to be drawn from them, must be consistent with that inference. Thus, the four facts above supposed are entirely consistent with the hypothesis that A poisoned B. But leave out the two intermediate facts, or leave out the last one, and B might as well have been poisoned by C as by A. Hence there is a fourth rule: that the collection of facts from which an inference is to be drawn must not only be consistent with the probable truth of that inference, but they must exclude the probable truth of any other inference. Thus, not only must it be shown that A bought poison, that B died of poison, that A was intimate with B and had a motive for 'wishing B's death, but, to justify a belief in A's guilt, the motive ought to be shown to have been so strong as to exclude the moral probability that B was poisoned by some one else, or poisoned himself. It is in the application of these rules that in courts of justice the minds of jurymen often become perplexed with doubts which they can not account for, or else they yield a too easy credence to the guilt of the accused when the question of guilt depends upon circumstantial evidence.

I shall not spend much time in contending that these rules of evidence must be applied to scientific investigations

which are to affect our belief in such a proposition as the descent of man from a common ancestor with the monkey. This is not only an hypothesis depending upon circumstantial evidence, but it is professedly a deduction from a great range of facts and from a very complex state of facts. In reasoning upon such subjects, when the facts which constitute the chain of circumstantial evidence are very numerous, we are apt to regard their greater comparative number as if it dispensed with a rigid application of the rules of determination. Every one can see, in the illustration above employed, borrowed from criminal jurisprudence, that the facts which constitute the chain of circumstantial evidence ought to be rigidly tested by the rules of determination before the guilt of the accused can be safely drawn as a deduction from the facts. But, in reasoning from physical facts to any given physical hypothesis where the facts are very numerous, there is a strong tendency to relax the rules of evidence, because, the greater the accumulation of supposed facts becomes, the greater is the danger of placing in the chain of evidence something that is not proved, and thus of vitiating the whole process. To this tendency, which I have observed to be very frequent among scientists, I should apply, without meaning any disrespect, the term invention. A great accumulation of facts is made, following one another in a certain order; all those which precede a certain intermediate link are perhaps duly and independently proved, and the same may be the case with those which follow that link. But there is no proof of the fact that constitutes the link and makes a complete chain of evidence. This vacuity of proof, if one may use such an expression, is constantly occurring in the writings of naturalists, and is often candidly admitted. It is gotten over by reasoning from the antecedent and the subsequent facts that the intermediate facts must have existed; and then the reasoning goes on to draw the inference of the principal hypothesis from a chain of

proof in which a necessary intermediate link is itself a mere inference from facts which may be just as consistent with the non-existence as with the existence of the supposed intermediate link. In such cases we are often told very frankly that no one has yet discovered that the intermediate link ever actually existed ; that the researches of science have not yet reached demonstrative proof of the existence of a certain intermediate animal or vegetable organization ; that geological exploration has not yet revealed to us all the specimens of the animal or vegetable kingdoms that may have inhabited this globe at former periods of time ; but that the analogies which lead down or lead up to that as yet undiscovered link in the chain are such that it must have existed, and that we may confidently expect that the actual proof of it will be found hereafter. The difficulty with this kind of reasoning is that it borrows from the main hypothesis which one seeks to establish the means of showing the facts from which the hypothesis is to be drawn as an inference. Thus, for example, the hypothesis is that the species called man is a highly developed animal formed by a process of natural selection that went on for unknown ages among the individuals descended from the progenitor of the anthropomorphous apes. The facts in the physical organization and mental manifestations of the animal called man, when viewed historically through all the conditions in which we know anything of this species, lead up to that common supposed ancestor of the apes. The facts in the physical organization and instinctive habits of the ape, when viewed historically through all the conditions in which we know anything of his species, show that he, too, was evolved by the process of natural selection out of that same ancestor. Intermediate, respectively, between the man and the monkey and their primordial natural-selection ancestor or predecessor, there are links in the chain of proof of which we have no evidence, and which must

be supplied by inferring their existence from the analogies which we can trace in comparing things of which we have some satisfactory proof. Thus, the main hypothesis, the theory of natural selection as the explanation of the existence of distinct species of animals, is not drawn from a complete chain of established facts, but it is helped out by inferring from facts that are proved other facts that are not proved, but which we have reason to expect will be discovered hereafter. I need not say that this kind of argument will not do in the common affairs of life, and that no good reason can be shown why our beliefs in matters of science should be made to depend upon it.

We do not rest our belief in what is called the law of gravitation upon any chain of proof in which it is necessary to supply a link by assuming that it exists. The theory that bodies have a tendency to approach each other, that the larger mass attracts to itself the smaller by a mysterious force that operates through all space, is a deduction from a great multitude of perpetually recurring facts that are open to our observation, no one of which is inferred from any other fact, while the whole excludes the moral probability that any other hypothesis will account for the phenomena which are continually and invariably taking place around us.

This illustration of the rules of evidence, when applied to scientific inquiries, leads me to refer to one of the favorite postulates of the evolution school. We are often told that it ought to be no objection to the doctrine of evolution that it is new, or startling, or contrary to other previous theories of the existence of species. We are reminded again and again that Galileo's grand conception was scouted as an irreligious as well as an irrational hypothesis, and that the same reception attended the first promulgation of many scientific truths which no intelligent

and well-informed person now doubts.* Then we have it asserted that the doctrine of evolution is now accepted by nearly all the most advanced and accomplished natural philosophers, especially those of the rising scientists who have bestowed most attention upon it. Upon this there are two things to be said : First, it is a matter of very little consequence that the learned of a former age did not attend to the proofs of the law of gravitation, or of any other new theory of physics, as they should have done, and that they consequently rejected it. Their logical habits of mind, their preconceived religious notions, and many other disturbing causes, rendered them incapable of correct reasoning on some particular subject, while they could reason with entire correctness on other subjects. Secondly, the extent

* Galileo's "heresy," that the earth moves round the sun, was condemned by a papal decree in the sixteenth century as "absurd, philosophically false, and formally heretical, because it is expressly contrary to Holy Scripture." No Roman Catholic now dreams of disputing what the Florentine astronomer maintained ; and the evolutionists are perpetually foretelling that the time will come when to question their doctrine will be admitted to be as ridiculous as was the papal interdict fulminated against Galileo. If their doctrine had nothing to confront it but a similar condemnation, proceeding from some ecclesiastical authority claiming to be "infallible," or, if it could be met only by the assertion that it is "contrary to Holy Scripture," there would be some analogy between the two cases. But there is a vast unlikeness between the two cases. While the hypothesis of animal evolution is plainly enough "contrary to Holy Scripture," no one who has any perception of the weakness of its proofs is obliged to rest his rejection of it on that ground. If, in the sixteenth century, there had been as good scientific and physical grounds on which to refute Galileo as there now are for questioning the doctrine of the evolution of distinct species out of other species, the papal condemnation would have been superfluous even for churchmen. We must not forget the age in which we live, or allow any kind of truth to fail of vindication, from fear of being classed with those who in some former age have blunderingly mistaken the means of vindicating truth. Belief in special creations, whatever the Bible may say, does not now, and in all probability never will, stand on a par with the belief that the sun moves round the earth.

to which a new theory is accepted by those whose special studies lead them to make the necessary investigations, does not dispense with the application of the laws of evidence to the facts which are supposed to establish the theory. The doctrine of evolution addresses itself not only to the scientific naturalist, but to the whole intelligent part of mankind. How is one who does not belong to this class of investigators to regulate his belief in the theory which they propound? Is he to take it on their authority? or is he, while he accords to their statements of facts all the assent which as witnesses they are entitled to expect from him, to apply to their deduction the same principles of belief that he applies to everything else which challenges belief, and to assent or dissent accordingly? No one, I presume, will question that the latter is the only way in which any new matter of belief should be approached. I have not supposed that any scientist questions this; but I have referred to the constant iteration that the doctrine of evolution is now generally admitted by men of science, that the assertion, supposing it to be true, may pass for just what it is worth. It is worth this and no more: that candid, truthful, and competent witnesses, when they speak of facts that they have observed, are entitled to be believed as to the existence of those facts. When they assume facts which they do not prove, but which are essential links in the chain of evidence, or when the facts which they do prove do not rationally exclude every other hypothesis excepting their own, the authority of even the whole body of such persons is of no more account than that of any other class of intelligent and cultivated men. In the ages when ecclesiastical authority exercised great power over the beliefs of men upon questions of physical science, the superiority was accorded to the authority which claimed it, and the scientist who propounded a new physical theory that did not suit the theologian was overborne. It seems

to me that it is a tendency of the present age to substitute the authority of scientific experts in the place of the ecclesiastical authority of former periods, by demanding that something more than the office of witnesses of facts shall be accorded to them. We are told that it is a very important proof of the soundness of deductions, that the deductions are drawn by the greater number of the specialists who have examined the facts. Sometimes this is carried so far as to imply presumption in those who do not yield assent to the theory, as if it ought to be accepted upon the authority of the experts whose proper office it is to furnish us with the facts, and whose deductions we have to examine upon the strength of their reasoning. Those of us who are not professors of the particular science may be charged with ignorance or incapacity if we do not join in the current of scientific opinion. But, after all, the new theory challenges our belief. If we examine it at all, we must judge of it, not by the numbers of those who propound or accept it, or by any amount of mere authority, but by the soundness of the reasoning by which its professors support it.

The reader is now informed of what he may expect to find discussed in this volume. It remains for me to indicate the mode in which the discussion will be carried on. I propose to divest my own mind, and so far as I may to divest the mind of the reader, of all influence from revealed religion. I shall not refer to the Mosaic account of the creation excepting as I refer to other hypotheses. With its authority as an account given by the Deity himself through his chosen servant, I have here nothing to do. Nor shall I rely upon the revelation recorded in the New Testament. All the inquiries which I propose to make are those which lie in the domain of natural religion; and while I can not expect, in exploring this domain, to make discoveries or to find arguments which can claim the merit of originality, I may avoid traveling in a well-

beaten path, by pursuing the line of my own reflections, without considering whether they coincide with or differ from the reasonings of others. Although, at a former period of my life, I have studied the great writers whose speculations in the science of natural theology are the most famous and important pieces in its literature, it is more than forty years since I have looked into one of them ; and I do not propose to turn to them now, in order to see whether they have or have not left any traces in my mind. It is quite possible that critics may array against me the authority of some great name or names ; but even if I am to be charged with presumption in entering upon this field, it will not be found, so far as I am conscious, that I have borrowed an argument, imitated a method, or followed an example.

There is a passage in one of the writings of Lord Macaulay in which that brilliant essayist maintained that natural theology is not a progressive science. Macaulay's tendency to paradox was often aggravated by the superficial way in which he used his multifarious knowledge. As in the course of this work I am about to do that which he regarded as idle, namely, to inquire whether natural religion, aside from revelation, is of any value as a means of reaching a belief in the existence and attributes of God and the immortality of man, I cite the passage in which Macaulay makes the assertion that natural theology has made no progress from the time of the Greek philosophers to the present day : "As respects natural religion, revelation being for the present altogether left out of the question, it is not easy to see that a philosopher of the present day is more favorably situated than Thales or Simonides. He has before him just the same evidences of design in the structure of the universe that the early Greeks had. We say just the same, for the discoveries of modern astronomers and anatomists have really added nothing to the force of that

argument which a reflecting mind finds in every beast, bird, insect, fish, leaf, flower, and shell. The reasoning by which Socrates in Xenophon's hearing confuted the little atheist Aristophanes, is exactly the reasoning of Paley's 'Natural Theology.' Socrates makes precisely the same use of the statues of Polycletus and the pictures of Zeuxis which Paley makes of the watch. As to the other great question, the question what becomes of man after death, we do not see that a highly educated European, left to his unassisted reason, is more likely to be in the right than a Blackfoot Indian. Not a single one of the many sciences in which we surpass the Blackfoot Indians throws the smallest light on the state of the soul after the animal life is extinct. In truth, all the philosophers, ancient and modern, who have attempted without the aid of revelation to prove the immortality of man, from Plato down to Franklin, appear to us to have failed deplorably.

"Then, again, all the great enigmas which perplex the natural theologian are the same in all ages. The ingenuity of a people just emerging from barbarism is quite sufficient to propound those enigmas. The genius of Locke or Clarke is quite unable to solve them. It is a mistake to imagine that subtle speculations touching the Divine attributes, the origin of evil, the necessity of human actions, the foundation of moral obligation, imply any high degree of intellectual culture. Such speculations, on the contrary, are in a peculiar manner the delight of intelligent children and of half-civilized men. The number of boys is not small who, at fourteen, have thought enough on these questions to be fully entitled to the praise which Voltaire gives to Zadig : 'Il en savait ce qu'on a su dans tous les ages ; c'est à dire, fort peu de chose.'

"The book of Job shows that, long before letters and arts were known to Ionia, these vexing questions were debated with no common skill and eloquence under the

tents of the Idumean emirs ; nor has human reason, in the course of three thousand years, discovered any satisfactory solution of the riddles which perplexed Eliphaz and Zophar. Natural theology, then, is not a progressive science." *

Here, in the space of two not very long paragraphs, is a multitude of allusions which evince the range of Lord Macaulay's reading, but which are employed, without very close thinking, in a quite inaccurate way, to sustain assertions that are not true. If he had said that a modern philosopher has before him in the structure of the universe not only all the same evidence of design which the early Greeks had, but a great deal more, he would have hit the exact truth. It is simple extravagance to say that modern astronomy has added nothing to the strength of the argument which shows the existence of a supreme lawgiver and artificer of infinite power and skill. What did the early Greeks know about the structure of the solar system, the law of universal gravitation, and the laws of motion? Compare the ideas entertained by the Greek philosophers of the phenomena of the universe with those which modern astronomy has enabled a modern philosopher to assume as scientific facts established by rigorous demonstration ; compare what was known before the invention of the telescope with what the telescope has revealed ; compare the progress that was made in Greek speculative philosophy from the time of Thales to the time of Plato, and then say whether natural religion had not made advances of the greatest importance even before modern science had multiplied the means for still greater progress. A brief summary of the Greek philosophy concerning the producing causes of phenomena will determine whether Lord Macaulay was right or wrong in the assertion that the "early Greeks" had as

* Macaulay's "Essays," etc., Riverside edition, vol. ii, 502-504.

good means of making true deductions in natural theology as the means which exist to-day.

All scholars who have attended to the history of Greek speculation know that the Greeks held to the belief in polytheistic personal agents as the active producers of the phenomena of Nature. This was the system of Homer and Hesiod and the other old poets. This was the popular belief held throughout all the Hellenic world, and it continued to be the faith of the general public, not only after the different schools of philosophy had arisen, but down to and after the time when St. Paul stood on Mars Hill and told the men of Athens how he had found that they were in all things too superstitious. Thales, who flourished in the first half of the sixth century before Christ, was the first Greek who suggested a physical agency in place of a personal. He assumed the material substance, water, to be the primordial matter and universal substratum of everything in Nature. All other substances were, by transmutations, generated from water, and when destroyed they all returned into water. His idea of the earth was that it was a flat, round surface floating on the immense watery expanse or ocean. In this he agreed with the old poets; but he did not, like them, suppose that the earth extended down to the depths of Tartarus. The Thalesian hypothesis, therefore, rejected the Homeric Okeanus, the father of all things, and substituted for that personal agency the agency of one primordial physical substance, by its own energy producing all other substances. This is about all that is known of the philosophy of Thales, and even this is not known from any extant writing of his, but it is derived from what subsequent writers, including Aristotle, have imputed to him.* Why Lord Macaulay should have selected Thales as the Greek philosopher who was as favor-

* Grote's "Plato," i, 4.

ably situated as a philosopher of the present day for dealing with questions of natural religion, is not very apparent. All that Thales did, assuming that we know what he did, was to strike out a new vein of thought, the direct opposite of the poetical and popular idea of the origin of phenomena.

From Thales to Plato, a century and a half intervened.* During this period there arose, according to Mr. Grote, twelve distinct schemes of philosophy, the authors of which that learned Englishman has enumerated, together with an admirable summary of their respective systems. From this summary certain things are apparent. All these philosophers, from Thales to Democritus, while each speculated upon Nature in an original vein of his own, endeavored to find an explanation or hypothesis on which to account for the production and generation of the universe by some physical agency apart from the mythical personifications which were believed in by the populace and assumed in the poetical theologies. Some of them, without blending ethics and theology in their speculations, adopted, as the universal and sufficient agents, the common, familiar, and pervading material substances, such as water, fire, air, etc.; others, as Pythagoras and his sect, united with ethical and theological speculations the idea of geometrical and arithmetical combinations as the primal scientific basis of the phenomena of Nature. But what was common to all these speculations was the attempt to find a scientific basis on which to explain, by physical generation, by transmutation and motion from place to place, the generation of the Kosmos, to take the place of generation by a divine personal agency or agencies. But while these speculations were of course unsuccessful, their abundance and variety, the inventive genius which they exhibit, the effort to find a scientific basis apart from the popular and poetic belief in a

* Thales flourished 620-560 B. C. Plato's life extended from 427-347 B. C.

multitude of personal and divine agencies, constitute, as Mr. Grote has well said, "one of the most memorable facts in the history of the Hellenic mind"; and "the mental effort required to select some known agency and to connect it by a chain of reasoning with the result, all this is a new phenomenon in the history of the human mind." Such an amount of philosophical speculations could not go on for a century and a half without enlarging the means for dealing with questions of natural theology; for they very nearly exhausted the "causings and beginnings" which could be assigned to regular knowable and predictable agencies; and these they carried through almost every conceivable form of action by which such agencies could be supposed to operate. While the authors of these systems of philosophy were constantly hampered by the popular and poetic conceptions of a diversified and omnipresent polytheistic agency, a belief which, as Mr. Grote has said, was "eminently captivating and impressive," and which pervaded all the literature of their time, their speculations accumulated a vast fund of ideas in the sphere of scientific explanations, which, although unsatisfactory to modern science, became, when we reach Plato, the principal influence which led him to revert to the former idea of a divine agency, intentionally and deliberately constructing out of a chaotic substratum the system of the Kosmos; and which also led him to unite with it the idea of a mode in which it acted on and through the primordial elements of matter.

So that, from the class of philosophers to whom Lord Macaulay presumably referred as "the early Greeks," down to and including Plato, there was a great advance. The earlier Greek philosophers did not divide substance from its powers or properties, nor did they conceive of substance as a thing acted upon by power, or of power as a thing distinct from substance. They regarded substance, some primordial substance, with its powers and properties, as an efficient and

material cause, and as the sole cause, as a positive and final agent. They did not seek for a final cause apart from the substances which they supposed to be the sole agents operating to produce important effects. But, inasmuch as they carried their various theories through nearly the whole range of possible speculation, they enabled Plato and Aristotle to see that there was a fundamental defect in their reasoning; that there must be an abstract conception of power as something distinct from substance or its properties. It was by Plato and Aristotle that this abstract conception was reached, of course without any influence of what we regard as revelation; and, although they did not always describe correctly the mode in which this power had acted, their perception of the logical necessity for such a final cause marks a great progress in philosophical speculation. It entirely refutes Lord Macaulay's assertion that natural theology is not a progressive science. It had made great progress from Thales to Plato; and while in a certain sense it is true that "a modern philosopher has before him just the same evidence of design in the structure of the universe which the early Greeks had"—that is, he has the same physical phenomena to observe—it is not true that the early Greeks did not develop conceptions of the origin of the universe valuable to their successors. Lord Macaulay should not have compared Thales with the modern philosopher, in respect of advantage of situation, but he should have compared the modern philosopher with Plato, and Plato with his predecessors; and if he had done this, he could not have asserted with any show of truth that natural theology has made no advance as a science from the time of Thales, the Milesian philosopher, and Simonides, the poet, to the present day. I shall have occasion hereafter to speak of the masterly intellectual power by which Plato wrought out his conception of a formative divine agency in the production of the Kosmos, and the bold and original specula-

tion by which he avoided the charge of infidelity toward the established religion of his countrymen.

When I come to speak of what modern astronomy has done in furnishing us with new means of sound philosophical speculation on the being, attributes, and methods of God, it will be seen whether Lord Macaulay is correct in the assertion that it has added nothing to the argument. At present I will briefly advert to what the "early Greeks," or any of the Greeks, knew of the structure of the solar system. We learn, from a work which dates from nearly the middle of the second century of the Christian era, what was the general conception of the solar system among the ancients, including the Greeks. This work is known as the "Almagest" of Ptolemy, and the name of the "Ptolemaic System" has been given to the theory which he describes. This theory was common to all the ancient astronomers, Ptolemy's statement of it being a compendium of what they believed. Its principal features are these : 1. The heavens are a vast sphere, in which the heavenly bodies are set, and around the pole of this sphere they revolve in a circle every day. 2. The earth is likewise a sphere, and is situated in the center of the celestial plane as a fixed point. The earth having no motion, and being in the center of all the motions of the other bodies, the diurnal revolutions of those bodies are in a uniform motion around it. 3. The sun, being one of the heavenly bodies making a revolution around the earth, was supposed to be placed outside of the position of Venus in the heavenly sphere. The order of the Ptolemaic system was thus : The moon was first, being nearest to the earth ; then came Mercury and Venus, the sun being between Venus and Mars. Beyond Mars came Jupiter and Saturn. Plato's arrangement was in one respect different, his order being the moon, the sun, Mercury, Venus, Mars, Jupiter, and Saturn. But this ideal heavenly sphere, with the earth in

the center of all the revolutions of the other bodies, and remaining quiescent—a theory which was common to all the ancient astronomers—was the result of observing the motions of the heavenly bodies as they appear to a spectator on the earth. Such a spectator would have this appearance of a celestial sphere presented to him wherever he might be ; and, judging from the apparent motions of the heavenly bodies relative to his own position at the center, he would conclude that the earth is at that center, and that it remains at rest, supported on nothing. It required certain discoveries to explode this system of a celestial sphere. First came Copernicus, who, about the middle of the sixteenth century of our era, published his demonstrations, which convinced the world of two great propositions : 1. That the diurnal revolution of the heavens is nothing but an apparent motion, caused by the revolution of the earth on its own axis. 2. That the earth is but one of a group of planets, all of which revolve around the sun as a center. Next came Kepler, who, in the early part of the seventeenth century, recognizing the truth of the Copernican system, determined the three laws of planetary motion : 1. That the orbit of each planet is an ellipse, the sun being in one focus. 2. That as each planet moves around the sun, the line which joins it to the sun passes over equal areas in equal times. 3. That the square of the time of a planet's revolution around the sun is in proportion to the cube of its mean distance from the sun. These laws were discovered by Kepler as deductions made upon mathematical principles from observations which had to be carried on without the aid of the telescope, and without that knowledge of the general laws of motion which came later. Kepler's laws, although in the main correct, were subsequently found to be subject to certain deviations in the planetary motions. It was when Galileo, the contemporary of Kepler, who, if he was not the first inventor of the telescope,

was the first to use it in astronomical observations, was able by means of it to discover the general laws of motion, that the substantial accuracy of Kepler's three laws could be proved, while at the same time the deviations from them were accounted for. Still, there was wanting the grand discovery, which would disclose the cause of these motions of the planets in elliptical orbits, and the relations between their distances and their times of revolution, and thus reduce the whole of the phenomena to a general law. Descartes, who flourished 1596-1650, first attempted to do this by his theory of Vortices. He supposed the sun to be immersed in a vast fluid, which, by the sun's rotation, was made to rotate in a whirlpool, that carried the planets around with it, the outer ones revolving more slowly because the parts of the ethereal fluid in which they were immersed moved more slowly. This was a reversion back to some of the ancient speculations. It was reserved for Newton to discover the law of universal gravitation, by which, in the place of any physical connection between the bodies of the solar system by any intervening medium, the force of attraction exerted by a larger body upon a smaller would draw the smaller body out of the straight line that it would pursue when under a projectile force, and would thus convert its motion into a circular revolution around the attracting body, and make the orbit of this revolution elliptical by the degree in which the attracting force varied in intensity according to the varying distance between the two bodies. When Newton's laws of motion were discovered and found to be true, the phenomena of the solar system were explained.

It may be interesting, before leaving for the present this branch of the subject, to advert more particularly to one of the philosophical systems of the Greeks, which, when compared with the discoveries of modern astronomy, illustrates the great addition that has been made to our means of sound

speculation upon the origin of the material universe. I refer to the system of the Pythagoreans—one of the most remarkable instances of the invention of facts to fit and carry out a theory that can be found in the history of philosophy, although we are not without striking examples of this practice in modern speculations. It has already been seen that, during the whole period of Greek philosophy before the time of Plato, the problem was to find a primordial and universal agent by which the sensible universe was built up and produced; supplying, that is to say, the matter and force required for the generation of successive products.* It has been seen that the Thalesian philosophers undertook to solve this problem by the employment of some primordial physical substance, such as water, fire, air, etc. Pythagoras and his school held that the essence of things consisted in number; by which they did not mean simply that all things could be numbered, but they meant that numbers were substance, endowed with an active force, by which things were constituted as we know them. In the Pythagorean doctrine number was the self-existing reality; not, as in Plato's system of ideas, separate from things, but as the essence or determining principles of things, and having, moreover, magnitude and active force.† This remarkably subtle conception of an agent in the production of material things evinces the effort that was making, in a direction opposite to that of Thales and his immediate successors, to find a First Cause. It was carried out by the Pythagoreans in the movements of the heavenly bodies, in the works of human art, and in musical harmony; in all of which departments, according to Mr. Grote, they considered measure and number as the producing and directing agencies. We are here concerned only

* Grote's "Plato," i, 10. I follow Mr. Grote in describing the hypothesis of the Pythagoreans.

† Ibid.

with their application of this theory to the celestial bodies. One of their writers is quoted by Mr. Grote as a representative of the school which was founded by Pythagoras (about 530 B. C.), and which extended into the Græco-Italian cities, where, as a brotherhood, they had political ascendancy until they were put down and dispersed about 509 B. C.; but they continued for several generations as a social, religious, and philosophical sect. According to this writer (Philolaus), "the Dekad, the full and perfect number, was of supreme and universal efficacy as the guide and principle of life, both to the Kosmos and to man. The nature of number was imperative and law-giving, affording the only solution of all that was perplexing or unknown; without number all would be indeterminate and unknowable."

Accordingly, the Pythagoreans constructed their system of the universe by the all-pervading and producing energy of this primordial agent, Number, in the manner thus described by Mr. Grote (i, 12-15): "The Pythagoreans conceived the Kosmos, or the universe, as one single system, generated out of numbers. Of this system the central point—the determining or limiting One—was first in order of time and in order of philosophical conception. By the determining influence of this central constituted One, portions of the surrounding Infinite were successively attracted and brought into system: numbers, geometrical figures, solid substances were generated. But, as the Kosmos thus constituted was composed of numbers, there could be no continuum; each numeral unit was distinct and separate from the rest by a portion of vacant space, which was imbibed, by a sort of inhalation, from the infinite space or spirit without. The central point was fire, called by the Pythagoreans the Hearth of the Universe (like the public hearth or perpetual fire maintained in the prytaneum of a Grecian city), or the watch-tower of Zeus. Around it revolved, from west to east, ten divine bodies, with unequal

velocities, but in symmetrical movement or regular dance. Outermost was the circle of the fixed stars, called by the Pythagoreans Olympus, and composed of fire like the center. Within this came successively, with orbits more and more approximating to the center, the five planets, Saturn, Jupiter, Mars, Venus, Mercury ; next, the sun, the moon, and the earth. Lastly, between the earth and the central fire, an hypothetical body, called the Antichthon, or counter-earth, was imagined for the purpose of making up a total represented by the sacred number ten, the symbol of perfection and totality. The Antichthon was analogous to a separated half of the earth, simultaneous with the earth in its revolutions, and corresponding with it on the opposite side of the central fire. The inhabited portion of the earth was supposed to be that which was turned away from the central fire and toward the sun, from which it received light. But the sun itself was not self-luminous : it was conceived as a glassy disk, receiving and concentrating light from the central fire, and reflecting it upon the earth, so long as the two were on the same side of the central fire. The earth revolved in an orbit obliquely intersecting that of the sun, and in twenty-four hours, round the central fire, always turning the same side toward that fire. The alternation of day and night was occasioned by the earth being, during a part of such revolution, on the same side of the central fire with the sun, and thus receiving light reflected from him ; and during the remaining part of her revolution on the side opposite to him, so that she received no light at all from him. The earth, with the Antichthon, made this revolution in one day ; the moon, in one month ; the sun, with the planets Mercury and Venus, in one year ; the planets Mars, Jupiter, and Saturn in longer periods respectively, according to their distances from the center ; lastly, the outermost circle of the fixed stars (the Olympus, or the Asslanes), in some unknown period of very long duration.

“The revolutions of such grand bodies could not take place, in the opinion of the Pythagoreans, without producing a loud and powerful sound ; and as their distances from the central fire were supposed to be arranged in musical ratios, so the result of all these separate sounds was full and perfect harmony. To the objection, Why were not the sounds heard by us ? they replied that we had heard them constantly and without intermission from the hour of our birth ; hence they had become imperceptible by habit.”

Beautiful as was this theory—the origin of the phrase, “the music of the spheres”—it owed its perfection as a theory to a pure invention, resorted to in order to carry out the hypothesis of the sacred number Ten, of which all the greater numbers were only compounds and derivatives. This perfect and normal Ten, as a basis on which to rest a bold astronomical hypothesis, required the imagination of the Antichthon, or counter-earth, in order, with the other bodies, to make up the primordial number to whose generative force the whole of these bodies owed their origin. The resort to this conception of number, as a formative and active agent, was doubtless due to the fact that the Pythagoreans were the earliest cultivators of mathematical science. We are told, in fact, that they paved the way for Euclid and Archimedes, notwithstanding their symbolical and mystical fancies, and from their mathematical studies they were led to give exclusive supremacy to arithmetical and geometrical views of Nature. But what is curious about this whole speculation is, that in the invention or substitution of certain facts in order to make a perfect theory, it resembles some modern hypotheses, in which facts have been assumed, or argued as existing from analogies, when there is no evidence which establishes them. Modern instances of this will appear hereafter.

Enough has now been said about the speculations of the “early Greeks” to show the extravagance of Lord Macau-

lay's assertion that the discoveries of modern astronomy have placed the modern philosopher in no better situation to make safe deductions in natural theology than that occupied by the Hellenic philosophers from Thales to Plato. The evidences of design in the formation of the solar system—of that kind of design which acts in direct and specific exertions of a formative will—have been enormously multiplied by the discoveries of modern astronomy. Those discoveries, instead of leaving us to grope among theories which require the invention or imagination of facts, relate to facts that are demonstrated; and they tend in the strongest manner to establish the hypothesis of an infinite Creator, making laws to govern material objects, and then creating a system of objects to be governed by those laws. In a future chapter I shall endeavor to show why this hypothesis in regard to the solar system is most conformable to the rules of rational belief.

Not to anticipate what will be said hereafter concerning the modern discoveries in anatomy and in comparative zoölogy, it is enough to say here that in the writings of the Greek philosophers, especially of Plato and Aristotle, we may discover what the Greeks knew or did not know, and may therefore compare their knowledge with what is now known. What was known about the human anatomy to the Greeks of Plato's time is probably pretty well reflected in his "*Timæus*," the celebrated dissertation in which he developed his theory of the Kosmos; for, although Plato in that superb philosophical epic made use of the organs of the human body for ethical and theological purposes, and did not make a special study of matters of fact, it is not probable that in his mode of using them he so far departed from the received ideas of his time respecting the human anatomy that his treatise would have been regarded by his contemporaries as an absurdity. Indeed, Mr. Grote considered that Plato had that anatomical knowledge which

an accomplished man of his time could hardly fail to acquire without special study.* Moreover, even Galen, who came five centuries after Plato, and whose anatomical knowledge was far greater than could have been commanded in Plato's day, was wholly wrong in respect to the functions of some of the human organs. He agreed with Plato's ethical view of the human organism, but not in his physiological postulates. He considered, according to Mr. Grote, that Plato had demonstrated the hypothesis of one soul to be absurd; he accepted Plato's triplicity of souls, but he located them differently. He held that there are three "originating and governing organs in the body: the brain, which is the origin of all the nerves, both of sensation and motion; the heart, the origin of the arteries; the liver, the sanguifacient organ, and the origin of the veins which distribute nourishment to all parts of the body. These three are respectively the organs of the rational, the energetic, and the appetitive soul."† Plato, on the other hand, had placed the rational soul in the cranium, the energetic soul in the thoracic cavity, and the appetitive soul in the abdominal cavity; he connected them by the line of the spinal marrow continuous with the brain, making the rational soul immortal, and the two inferior souls, or two divisions of one inferior soul, mortal. Galen did not decide what is the essence of the three souls, or whether they are immortal. Plato assigned to the liver a very curious function, or compound of functions, making it the assistant of the rational soul in maintaining its ascendancy over the appetitive soul, and at the same time making it the seat of those prophetic warnings which the gods would sometimes vouchsafe to the appetitive soul, especially when the functions of the rational soul are suspended, as in sleep, disease, or ecstasy.

* Grote, iii, 290.

† Ibid., 287, 288.

But while there was much scientific progress from Plato to Galen, and while Galen's physiological ideas of the functions of the brain, the heart, and the liver held their place until Harvey's discovery of the circulation of the blood in the seventeenth century, that discovery and the subsequent investigations proved that Galen, although not far wrong as to the brain, was wholly wrong as to the liver, and partially wrong as to the heart. Yet Galen's physiological theories concerning these organs were founded on many anatomical facts and results of experiments, such as could then be made.

There is another fact which marks the state of anatomical knowledge among the Greeks in the time of Plato, and of Aristotle, who belonged to the same century. The "Timæus" of Plato shows that there were physicians at that period, and that he was acquainted with the writings of Hippocrates. The important fact is, as stated by Mr. Grote, that "the study and practice of medicine was at that time greatly affected by the current speculations respecting Nature as a whole; accomplished physicians combined both lines of study, implicating cosmical and biological theories."*

It is now only needful to say that modern anatomy and physiology afford aids to sound deductions in natural theology in reference to the structure of the human body as an animal organism, and all the functions of its different organs, which immeasurably transcend all that was known or assumed among the early Greeks, or in the time of Plato and Aristotle, or in the time of Galen. Notwithstanding the dispute whether the origin of man as an animal is to be referred to a special act of creation, or to the process of what has been called evolution, there can be no controversy on one point, namely, that modern anatomy and physiology

* Grote, iii, 289.

have vastly increased our knowledge of the structure of the human frame, and the means of rational speculation upon the nature of intellect, as compared with any means that were possessed by the most accomplished and learned of the Greeks of antiquity. It matters little on which side of the controversy, between creation and evolution, the great anatomists of the present day range themselves. It is upon the facts which their investigations have revealed that we have to judge of the probable truth of the one hypothesis or the other. The probable destiny of man as an immortal being is an inquiry that has certainly lost nothing by our increased knowledge of the facts in his animal structure which tend to support the hypothesis of design in his creation.

Lord Macaulay attributes an utter failure to the efforts of the philosophers, from Plato to Franklin, to "prove" the immortality of the soul without the help of revelation. What did he mean by proof? Revelation is, of course, the only direct proof. It is so, because it is direct testimony of a fact, proceeding from the only source that can have direct and certain knowledge of that fact. When the evidences which are supposed to establish the existence and authority of the witness have become satisfactory to us, we are possessed of proof of our immortality, and this proof is the only direct evidence of which the fact admits, and it constitutes all that should be spoken of as proof. But there is collateral although inferior evidence—inferior, because it consists in facts which show a high degree of probability that the soul of man is immortal, although this kind of evidence is not like the direct testimony of a competent witness. Is all this presumptive evidence, with its weighty tendency to establish the probable truth of immortality, to be pronounced of no value, because it belongs to a different order of proof from that derived from the assertion of a competent witness to the fact? It is one of the advantages

of our situation in this life, that the collateral evidence which tends to show the high probability of a future state of existence is not withheld from us. As a supplemental aid to the direct teaching of revelation, it is of inestimable importance if we do not obscure it by theories which pervert its force, and if we reason upon it on sound philosophical principles. What we have to do in estimating the probable truth of our immortality, as shown by the science of natural religion, is to give the same force to moral evidence in this particular department of belief, that we give to the moral evidence which convinces us of many things of which we have no direct proof, or of which the direct proof lies in evidence of another kind.

“He knew as much about it,” said Voltaire, “as has been known in all ages—that is to say, very little indeed.” This, like many of the witticisms of Voltaire, pressed into the service of an argument against the value of natural religion at the present day when studied by mature and disciplined minds, is quite out of place. What human reason has done in the course of three thousand years is not to be put on a par with the speculations of intelligent children or half-civilized men; and although some of the riddles which perplexed Eliphaz and Zophar have not had a perfectly satisfactory solution, it is quite wide from the truth to assert that there has been no approximation to a satisfactory solution, or that some of the riddles have not ceased to be the riddles which they were three thousand years ago. In that period there has been an accumulation of evidence concerning the phenomena of Nature, and the phenomena of mind, vast beyond comparison when placed in contrast with what was known in the tents of the Idumean emirs, and the importance of this accumulation of evidence is proved by the fact that theories have been built upon it which undertake to explain it by hypotheses that were never heard of before, and which may possibly leave the

“riddles” in a far less satisfactory state than they were in the time of Job. On the other hand, while the companions of Job may have been unable to suggest to him any solution of the problems of life, it does not at all follow that we are as helpless as they were, even if we avail ourselves of nothing but what the science of natural theology can now teach us.*

It will be seen that I attach great importance to natural theology. But I do not propose to write for the confirmed believers in revelation, on the one hand, who have become convinced by the evidence which supports revelation ; or for those, on the other hand, who believe nothing, and who have become confirmed in habits of thinking which unfit them for judging of the weight of evidence on such subjects as the existence of God and the creation of man. I write for that great mass of people of average intelligence, who do not understand accurately what the doctrine of evolution is as expounded by its leading representatives, and who do not know to what it leads. It will be found that in some respects there is a distinction between the school of which Darwin is the representative and the school which follows Spencer. To point out this distinction, and yet to show that both systems result in negatives which put an end to the idea of immortality, and that the weight of evidence is against both of them, is what I propose to do.

* It should be stated that the passage from Macaulay's writings here commented on was written and first published in 1840, before the speculations of the scientists who maintain the doctrines of evolution had attracted much attention, or been promulgated in their present shape.

CHAPTER II.

The Platonic Kosmos compared with the Darwinian theory of evolution.

It is my purpose in this chapter to draw a parallel between the theory of the origin of different animals propounded in the "Timæus" of Plato and that of Mr. Darwin. The analogy between them has been briefly hinted by Mr. Grote, but he has not followed it out in detail, as it was no part of his object to make minute comparisons between any of the speculations of Plato and those of modern philosophers. The great English scholar and critic seems to regard it as somewhat uncertain how far Plato meant in the "Timæus" to have his description of the Kosmos stand as an expression of his own belief, or as a mere work of his imagination and fancy. Plato, we are told, and this is quite obvious, dealt but little with facts, while he dealt largely with theories. But, even as a pure work of the imagination, or as a philosophical epic, the daring conception of the Kosmos is wonderfully complete; and it will repay any one, who follows Mr. Grote in his analysis of it, to observe how Plato employs a process of degeneration to account for the formation of different species of animals, from the higher to the lower, by agencies that bear a strong resemblance to those which are assumed by Darwin to have worked in the opposite process of variation and natural selection, resulting in the evolution of a higher from a lower animal. But, in order to render this comparison intelligible, it is necessary to make an abstract of Plato's system of the Kosmos before adverting to the analogies between that system and the

Darwinian theory. I follow, although I have greatly condensed, Mr. Grote's description of the Platonic Kosmos.

According to the Platonic idea of the Kosmos, as given in the "Timæus," there existed, anterior to all time, primordial matter in a state of chaos. This matter was not created; for, according to Mr. Grote, whose authority upon such a point is the highest, the notion of absolute creation was unknown to the Greeks of antiquity, and it does not appear that Plato suggests it. But, without accounting for its existence, Plato assumes that there was matter in a condition of utter chaos before time could have had an existence; and, in order to make the chaotic condition the more impressive in its primitive destitution of all form or active principles tending to union or arrangement, he supposes that the four elements of fire, air, earth, and water had no existence save in the abstract, or as ideas and forms. But, as abstract ideas, these four elements of fire, air, earth, and water were distinct, self-existing, and indestructible, coeval with the chaotic matter which was waiting to receive their impress and to take on their distinctive elemental characters. They had already begun to act on the *fundamentum*, or primordial chaotic matter, as upon a recipient, but it was in a confused way and without regularity of plan, so that they had not become concrete existences or determinate agents.

In this state of things there appears upon the scene the Demiurgus, a being coeval with the chaos of matter, that is, self-existing and eternal. But, consistently with the philosophy which did not admit of the idea of absolute creation, the Demiurgus was not a creator, but an architect or designer, working on materials that lay within his reach. His moral attribute was goodness, which was, in his situation, synonymous with order, regularity, symmetry, and proportion, and, along with this tendency, he had supreme artistic skill. In other words, he was the personification of

vous, or reason, working against necessity : the latter being, not what we mean by that term, something preordained and fixed, but confusion, uncertainty, irregularity, and unreason, which are to be overcome by their opposites.

Besides the chaotic matter and the ideas or forms of the four elements, as yet unrealized in the actual substances of fire, air, earth, and water, there were coeval ideas or forms of animals, or, as we should say, abstract animals, or conceptions of animals. The first and grandest of these was the eternal self-animal, or the ideal of animal existence. Next came the ideas or forms of four other animals : 1. The celestial gods ; 2. Man ; 3. Birds, or animals living in air ; 4. Land or water animals. Bearing in mind that we are still in the region of abstract conceptions in regard to these types of animals, which as yet have no concrete existence, and that they are, so to speak, the intellectual models from which the Demiurgus is to work, in order to make the real animals conformably to the pre-existing and eternal plan, we come to the process of forming the Kosmos, which is to be the containing animal of all the other four. Out of the confused chaos of existing matter the Demiurgus proceeds to construct the Kosmos, which was to become the one self-animal, by impressing the idea or abstract form of animal upon a physical structure built out of the primordial chaotic matter and comprehending the whole of it. The first step was to bring the four elements of fire, air, earth, and water out of their chaotic and confused condition by separating them according to the forms of their eternal ideas. The total of each element, when made to take its normal form, was used in the construction of the Kosmos, which thus came to possess the whole existing body of material ; “so that,” to borrow the words of Mr. Grote, “there remained nothing of the four elements apart, to hurt the Kosmos from without, nor anything as raw material for a second Kosmos.”

The Kosmos was made a perfect sphere, and with a perfectly smooth outer surface, without organs of sight or hearing, because there was nothing outside to be seen or heard ; without organs of respiration, because there was no outside atmosphere to be breathed ; and without nutritive or excrementary organs, because it was self-sufficing, being supplied with nourishment by its own decay. It was not furnished with limbs or means of locomotion or standing, because, being a sphere turning on an axis, and having only one of the seven possible varieties of movement, namely, rotation in a circle in one and the same plane, there was nothing for it to grasp or repel.* This body, the only-begotten, because in its formation all existing bodily material was employed, perfectly spherical and smooth, equidistant from its center to all points of its circumference, and suspended upon its own axis traversing its diameter, was now to be animated by a soul.

The Demiurgus, in the formation of the soul of the Kosmos, took three constituent ingredients and mixed them together. They were : 1. The Same, or the Identical, the indivisible and unchangeable essence of Ideas ; 2. The Different, or the Plural, the divisible essence of bodies or of the elements ; 3. A compound of both of these ingredients melted into one. Blended together in one grand compound, these three ingredients formed the soul of the Kosmos by first dividing the mixture into different portions, and then uniting the portions according to a complicated scale of harmonious numerical proportions. The outer or sidereal sphere of the Kosmos was made to receive the Same, or Identity, by being placed in an even and undivided rotation toward the right, turning on the great axis of the whole sphere. The interior, or planetary spheres, the five

* Rotation was considered the movement most conformable to reason and intelligence, and it is impracticable to any figure but the spherical. Grote, iii, 253.

planets, and the sun and the moon, were made to be under the influence of the Different, or Diversity—that is to say, their rotations on their separate axes, all oblique, were toward the left, while the overpowering force of rotation of the outer sphere carried them along with it, although the time of their separate rotations was more or less modified by their own inherent and countermoving forces.

Thus the sentient capacity of the cosmical soul became the cognition of the Same and the Different, and the blended Same and Different, because it embodied these three ingredients in its own nature. It was invisible ; rooted at its center and pervading and inclosing the whole visible body, circulating and communicating, without voice or sound, all impressions and information concerning the existing relations between the separate parts and specialties of the cosmical body.

Anterior to the Kosmos there was no time. With the rotation of the Kosmos time began. It was marked first by the eternal and unchanging rotation of the outer circle, in which were placed the fixed stars, which revolved with it in unaltered position with regard to each other ; and one revolution of this outer or most rational circle made a day. The sun, moon, and planets were distributed in different portions of the Circle of the Different ; one revolution of the moon marking a month, and one revolution of the sun marking a year. The earth, the first and oldest of the sidereal and planetary gods, was packed around the great axis which ran through the center of the Kosmos, and turned that axis ; so that the earth regulated the movement of the great cosmical axis, and was the determining agent of night and day.

Thus far we have the formation of the Kosmos, animated with a pervading soul, the body being formed out of the whole of existing matter, molded into the specific elements

of fire, air, earth, and water, and the soul being formed out of the constituent ingredients furnished by the eternal and invisible essence of ideas. The whole, body and soul of the Kosmos, was thus an animal, formed on the abstract but eternal idea or form of an animal which had existed before time began. We now approach the formation of the other animals. Of the Kosmos there could be but one. All existing material of matter had been used in his construction. He could not become a species, as there could be no second Kosmos. Something could be borrowed from him, for the formation of other animals, but nothing could be destroyed. He was not yet, however, a full copy of the model of the Generic Animal or Idea of Animal, because the eternal plan of that model required that he should be peopled or inhabited by four other animals, which might constitute species. Accordingly, the Demiurgus proceeds to form the first of these sub-animals, the gods, who are to inhabit different portions of the Kosmos. The first of these in formation was the earth, planted in the center, and made sentinel over night and day; next the fixed stars, formed chiefly out of fire, and placed in the outer circle of a fixed revolution, or the Circle of the Same, to give to it light and brilliancy. The sidereal orbs thus became animated beings, eternal and divine. They remained constantly turning round in the same relative position, but the sun, moon, and planets, belonging to the Circle of the Different, and trying to revolve by their own effort in a direction opposite to that of the outer sphere, became irregular in their revolutions and varied in their relative positions. Thus the primitive gods were the earth and the fixed stars, which revolved without variation with the Circle of the Same, and became immortal as well as visible; while the sun, moon, and planets were not among the primitive gods, but were simply spherical bodies placed in the inner Circle of the Different. The primitive gods preside over

and regulate the Kosmos. From them are generated and descended the remaining gods.*

Having completed the Kosmos and the primitive gods, the Demiurgus paused in his work. There were still other animals to be constructed, the first and noblest of which was to be Man. But the Demiurgus, who, in the construction of these gods, had made them immortal, not in

* The primitive gods of Plato's conception (in the "Timæus") are not to be confounded with the gods of the poetic and popular faith. As Mr. Grote has pointed out, there is nothing more remarkable in Plato's writings than the subtilty and skill with which he contrived to elude the charge of impiety and infidelity toward the gods of tradition and of the popular faith. In a passage of the "Timæus," on which Mr. Grote seems to be in doubt whether it was ironical or sincere, Plato boldly confronts the difficulty by saying that we must believe competent witnesses whose testimony we have, respecting the genesis of the remaining gods who have personal names and were believed in by his contemporaries. For his own part, he says, he does not pretend to account for their generation. The sons of the gods, the heroic and sacred families, who must have known their own fathers and all about their own family affairs, have given us their family traditions, and we must obey the law and believe. But concerning the primitive gods, the first progenitors of the remaining gods, we are at liberty to speculate. The ingenuity of this admission of authority where authority has spoken, reconcilable with speculation upon matters on which authority has not spoken, is admirable. Plato, as Mr. Grote has observed, was willing to incur the risk of one count of the indictment which was brought against his master Socrates, that of introducing new divine persons. In legal parlance he might have demurred to this count, as not charging any offense against the established religion. But the other count, for not acknowledging the gods whom the city acknowledged, he did not choose to encounter. As to them, he prudently, and perhaps sarcastically, accepts the testimony of witnesses who speak by inspiration and authority. But as to the primitive gods, the progenitors of the gods from whom were descended the heroic and sacred families of men, he expresses in the "Timæus" his own convictions, without appealing to authority and without intimating that he is speaking of mysteries beyond the comprehension of his reason. The boldness of this flight beyond all authority into the realms of pure reason is very striking, even if it does end in nothing but probability, which is all that Plato claims for his theory.

their own nature but through his determination, seems to have apprehended that, if he proceeded to construct the other animals himself, they would likewise be thereby rendered of immortal duration. He therefore assembled the newly generated gods and made to them a personal address. He informed them of their immortal existence, and of his purpose to confide to them the construction of the other animals, stating at the same time, in the case of man, that he would himself supply an immortal element which they were to incorporate with a mortal body, in imitation of the power which he had exercised in the generation of themselves. He then proceeded to compound together, but in inferior perfection and purity, the remnant of the same elements out of which he had formed the cosmical soul.* He then distributed the whole of this mass into souls equal in number to the fixed stars, placed each of them in a star of its own, where it would be carried round in the cosmical rotation, explained to it its immortal destiny, and that at an appointed hour of birth it would be transferred into a mortal body in conjunction with two inferior kinds of soul or mind. These irrational enemies, the two inferior souls, the rational and immortal soul would have to control and subdue, so as to live a good life. If it triumphed in the conflict, it would return after death to its own star, where in an everlasting abode it would dwell forever in unison with the celestial harmonies and perfections of the outer sphere. But, if it failed, it would be born again into

* It must be remembered that, in the formation of the cosmical soul, the ingredients were the eternal Ideas; of these there could be a remnant after the cosmical soul was formed. But the cosmical body, which was formed out of the material elements, comprehended the whole of them, and there could be no remnant or surplus of them remaining outside. But portions of them could be borrowed for a limited period of mortal existence, and would return to their place in the Kosmos when that existence terminated. If this distinction be carried along, Plato will not be found to be inconsistent with himself.

an inferior body, and on the death of that body, if it continued evil, it would be again born into a still more degraded animal, through an indefinite transmigration from animal to animal, until the rational soul should have obtained the mastery over the irrational and turbulent, when it would be released and permitted to return to its own peculiar star.* Here, then, the Demiurgus retired, leaving to the gods the work of fabricating mortal bodies for man, and two mortal and inferior souls, with which the immortal soul was to be joined. But before he withdrew he inculcated upon the gods to construct the new mortal animal in the best manner, so that the immortal soul should have the fairest chance of guiding and governing rightly, in order that the animal might not be the cause of mischief and misery to himself; a possible and even probable result which the Demiurgus proclaimed beforehand, thus relieving himself of responsibility, and casting it, it would seem, upon the gods.† The latter stood, then, in the position of workmen, who have received certain directions from a superior architect, have been supplied with certain materials, and are obliged to conform to a prescribed model, the

* It does not distinctly appear what was to become of the rational soul if it finally failed in the conflict with evil, at the lowest end of the transmigration. Being immortal, it could not perish. But in providing for it an opportunity of final success through all the forms of animal life to which it might be condemned, it would seem that Plato was pressed by a reluctance to encounter the idea of endless misery. This point, however, does not obscure his explanation of the process by which species of animals, and a succession of inferior animals, came to exist.

† Mr. Grote has pointed out that in his other writings, notably in the "Republic" and in the "Leges," Plato is not consistent with this idea that the gods are responsible for the evil that man causes to himself; and that in the "Timæus" he plainly makes the Demiurgus responsible, because he brings, or allows to be brought, an immortal soul down from its star, where it was living pure, intelligent, and in harmony with reason, and makes it incur corruption, disturbance, and stupidity, by junction with a mortal body and two mortal and inferior souls.

cosmical animal, as far as circumstances will allow. The Demiurgus retires, and leaves the gods to their work.

They borrow from the Kosmos, from which they are permitted to obtain materials, portions of the four elements, for the construction of the human body, with an engagement that these materials shall one day be returned. These they unite in one body by numerous minute and invisible fastenings; over this body they place a head or cranium, into which they introduce the immortal soul, making the head, with its spherical form like that of the Kosmos, and admitting of no motion but the rotary, the most divine portion of the human system and master of the body, which is to be subject and ministerial. To the body they give all the six varieties of motive power, forward, backward, upward, downward, to the right and to the left. The phenomena of nutrition and sensation begin as soon as the connection is formed between the immortal soul and the mortal body, but as the irregular movements and agitations arising from the diverse rotations of the Same and the Different convey false and foolish affirmations to the soul in the cranium, that soul is destitute of intelligence when first joined to the body, and remains so for some time. But gradually these disturbing currents abate, the rotations of the Same and the Different in the head become more regular, and the man becomes more intelligent.

It is now necessary to account for the introduction of the two mortal souls, and to show how the conflict appointed for the immortal soul became the test of a life which was to determine whether the latter should be permitted, on the death of the body, to return to its peculiar star, or whether it should be degraded into some lower form of animal. The immortal soul has its special abode in the head, which is both united to and separated from the trunk by the neck. The gods kept the two mortal

souls separate, so that the rational or immortal soul might be defiled by the contact as little as possible. The better portion of the mortal soul they placed in the thoracic cavity. It was the energetic, courageous, contentious soul, placed above the diaphragm, so as to receive orders easily from the head, and to aid the rational soul in keeping the mutinous soul of appetite, which was placed below the diaphragm, in subjection.

It is unnecessary to follow here the minute anatomical descriptions which Plato gives of the different organs of the human body, or of the way in which they are supposed to act on the two divisions of the mortal soul, or to be acted on by them, or the mode in which the latter act upon the encephalic or immortal soul which is seated in the cranium. These descriptions evince much knowledge of the human anatomy, and probably all the knowledge that was possessed in Plato's time. It is immaterial how far this anatomical knowledge was correct, and of course there was in Plato's use of the various organs a great deal that was fanciful. It is sufficient, without following Mr. Grote's analysis through these details, to note that, in Plato's arrangement, the immortal soul was supposed to be fastened in the brain, the two mortal souls in the line of the spinal marrow continuous with the brain, and that this line formed the thread of connection between them all.

Passing on toward the point where the process of degradation might begin, which would result in the reduction of this new and divinely constructed animal to a lower form, we have to note, first, that it was made a non-sexual animal, being intended for an angelic type. In the original plan of the gods, it was not contemplated that this primitive type should reproduce itself by any process of generation. According to the original scheme, it would seem that every time a new immortal soul was to be brought down from its peculiar star, the process of con-

structing for it a mortal body would have to be repeated. Plato, Mr. Grote observes, does indeed tell us that the primitive non-sexual type had the option of maintaining itself. But this must mean that each individual of that type had the option of maintaining itself in its struggle with the debasing influences of appetite and disease. But not one representative of it has held his ground ; and as it was foreseen that such an angelic type could not maintain itself, we are to look for a reconstruction of the whole organism. This came about from the degeneracy of the primitive non-sexual animal below the standard of good life which it had the option of continuing. Men whose lives had fallen below this standard became effeminate, cowardly, unjust. In their second birth, their immortal souls had to be translated into a body resembling that to which they had debased the first body into which they were born. The first transition, therefore, was from man into woman. In other words, the gods, seeing that the non-sexual primitive type did not maintain itself at the high point intended for it, reconstructed the whole organism upon the bi-sexual principle, introducing the comparatively lower type of woman. A partial transformation of the male structure makes the female. A suitable adjustment of the male organs, and the implanting of the sexual impulse in both sexes, by the agency of the gods, make provision for generative reproduction, and a species is formed, which takes the place of the primitive non-sexual type which did not reproduce itself in the original scheme. The primitive type disappears, and it disappears by a process of degradation, which it undergoes by reason of its failure to avail itself of the option which it originally had of living a good life that would entitle the immortal soul to return to its peculiar star without further conflict with the debasing tendencies to which it was exposed in the first body that it inhabited.

In this curious theory we see how a process of declen-

sion or degradation is induced by what may almost be called a choice, since the primitive human being, by not resisting the debasing tendencies of his lower nature, is made by those tendencies to assume a less divine form than that in which he originally existed. To the primitive man the gods assigned the encephalic or head-soul, which was connected with and suspended from the divine soul of the Kosmos. They assigned it to each man as his presiding genius. If he neglected it, and directed all his development toward the energetic or appetitive mortal soul, he would become debased. He did so. Hence it became necessary for the gods to reconstruct the whole organism, and in this reconstruction the primitive non-sexual type becomes the bi-sexual, and a species is formed.

It is not necessary to enter into the metaphysical argument which relates to the question of responsibility for this change from the original plan. Plato tells us that the gods foresaw it as a necessary consequence of the original scheme; and, moreover, that they foresaw that they must make preparation for the still more degenerate varieties of birds and quadrupeds, into which the corrupt and stupid part of mankind would sink, all of which were according to the great eternal scheme of the four kinds of ideal animals embraced in the idea of the Kosmos itself. But with the moral justice of the whole theory we have no concern here. We are here concerned, first, with the nature of the process by which, in the Platonic theory, the bi-sexual human race became formed out of the primitive non-sexual type; and, next, with the process by which individuals of this race became degraded into the lower animals.*

* I have omitted the description of the influence of disease induced by an over-indulgence of appetite, etc., in aiding the process of debasement from the primitive type. The reader can find this influence developed in Grote, or can consult the original Greek of the "Timæus." It would appear that Plato considered the effect of all the appetites, when too much in-

After the process of degradation had begun, after the primitive type had given place to the bi-sexual human race, and a species was thus formed, further degradation would be inevitable under the same causes which produced the first one. The female part of mankind would go on bringing forth new males and new females, and to each one at birth there would come from its peculiar star an immortal soul, for I do not understand that Plato's women were supposed not to be constructed, in this respect, upon the same plan as the men. But each of these newly arrived immortal souls would be placed in a mortal body in contact and conflict with the two mortal souls of appetite, disturbance, and mutiny against the divine laws of reason. Each new human being would then be exposed to further debasement, by which his or her human organs and human form would undergo transformation into a lower type of animal life. Accordingly, we find that Plato, in perfect consistency with his theory, supposes that birds are a degraded birth or formation derived from one peculiar mode of degeneracy in man, hair being transmuted into feathers and wings. If we inquire from what kind of men the birds were formed, and how they came to be assigned to the air, we shall best learn from the words employed by Mr. Grote to express Plato's idea: "Birds were formed from the harmless but light, airy, and superficial men, who, though carrying their minds aloft to the study of cosmical phenomena, studied them by visual observation and not by reason, foolishly imagining that they had discovered the way of reaching truth." *

Next to the birds came the land-animals, a more brutal formation. These, to borrow the words of Mr. Grote's analysis, "proceeded from men totally destitute of philoso-

dulged, as tending in the primitive non-sexual type toward the development of that lower kind of animal which the gods saw fit to treat as fit only to become woman.

* Grote.

phy, who neither looked up to the heavens nor cared for celestial objects ; from men making no use whatever of the rotations of their encephalic soul, but following exclusively the guidance of the lower soul in the trunk. Through such tastes and occupations, both their heads and their anterior limbs became dragged down to the earth by the force of affinity. Moreover, when the rotation of the encephalic soul from want of exercise became slackened and fell into desuetude, the round form of the cranium was lost and became converted into an oblong or some other form. These now degenerated into quadrupeds and multipeds, the gods furnishing a greater number of feet in proportion to the stupidity of each, in order that its approximation to earth might be multiplied. To some of the more stupid, however, the gods gave no feet or limbs at all, constraining them to drag the whole length of their bodies along the ground, and to become reptiles. Out of the most stupid and senseless of mankind, by still greater degeneracy, the gods formed fishes, or aquatic animals—the fourth and lowest genus after men, birds, land-animals. This race of beings, from their extreme want of mind, were not considered worthy to live on earth, or to respire thin and pure air. They were condemned to respire nothing but deep and turbid water, many of them, as oysters and other descriptions of shell-fish, being fixed down at the lowest depth or bottom. It is by such transitions (concludes the Platonic ‘*Timæus*’) that the different races of animals passed originally, and still continue to pass, into each other. The interchange is determined by the acquisition or loss of reason or rationality.” *

Here, then, we have a process of degradation by which the different races of animals were formed, by a kind of selection which, commencing in the human species from the neglect of the encephalic soul to maintain its high duties

* Grote’s “*Plato*,” iii, 282.

and aims, goes on in successive debasements which result in the formation of lower and still lower animals until we reach the shell-fish fixed upon the earth at the bottom of the water. The bi-sexual principle of construction having been introduced in the human species, was continued through all the other species formed by the still descending process of deterioration, so that to each successive species there remained the power of reproducing its own type, along with the tendency to evolve a lower type by further loss of reason or rationality. It is not material to the purpose of the parallel, which I am about to draw between the Platonic and the Darwinian system, to consider the precise nature of the Platonic idea of an intelligent power, by which these successive degradations were in one sense purposely ordained. Enough is apparent on the Platonic system to show that, while these degradations were according to an eternal plan, because they resulted from the conflict between reason and unreason, order and disorder, between purity and impurity, yet the different species of animals, after man, were not special creations by an infinite power interfering in each case by a separate exercise of creative will. They were a growth of an inferior organization out of a superior through the inevitable operation of tendencies which changed the forms of the animals. As fast as these tendencies operated—and they were continually operating—the ministers of the Demiurgus, the gods, stood ready to adapt the structure to the new conditions in which the tendencies resulted, so that the new animal might be fitted to and fixed in those conditions. Still, the gods are not represented as making separate creations of new species as an act of their will, without the pre-existing operation in the preceding type of tastes and occupations which modify the structure into one of a more degraded character. It may thus be said with entire truth that the Platonic idea of the origin of the different races of animals presents a parallel to the Darwinian

theory, in which it will be found that the one is the reverse of the other, both of them proceeding upon and involving analogous principles of evolution, operating in the one system from below upward, and in the other from a higher point downward. If, in the Platonic system, the idea of an original immortal soul placed in a heavenly abode, but afterward brought down and fixed in a mortal body, is the starting-point—if a conflict of a spiritual and angelic existence with corporeal and earthly tendencies is at first the predominant fact—the parallel between the Platonic process of degradation and the Darwinian process of elevation remains the same; for, in the one system, reason degenerates into instinct, and instinct at last reaches its lowest possible action, or ceases entirely; and, in the other, instinct rises from its lowest action through successive improvements until it becomes mind or intellect: so that somewhere in the two processes there must be a point where they pass each other in opposite directions, the one losing or merging intellect in instinct, the other losing and merging instinct in mind, each of the two processes being a process of development or evolution, but in opposite directions.*

It is not easy to ascertain at once what was Mr. Darwin's idea of the mode in which a supreme intelligence has presided over the creation. In his work on "The Descent of Man," he adduces some evidence that man was not "originally endowed with the ennobling belief in the existence of an Omnipotent God," this evidence being that numerous savage races have existed, and still exist, who have had and have no words in their language to express this idea. But this, if true, does not help us to understand what part in Mr. Darwin's theory an Omnipotent God is supposed to play. Scattered through the same work we

* See, as to the reception of the Platonic Demiurgus by the Alexandrian Jews, first chapter.

find references to the hypothesis of such a being, and to the influences which this belief has exerted upon the advance of morality. But I assume that we are to understand that Mr. Darwin adopts as a fact, to be taken into account in judging of his theory of evolution, that there is such a being as an Omnipotent God, having equally the power to make separate creations, or to establish certain laws of matter, and to leave them to operate through secondary causes in the production and extinction of the past and present inhabitants of the world. In his work on the "Origin of Species" he refers to "what we know of the laws impressed upon matter by the Creator." * In his "Descent of Man" the following passage occurs toward the close of the work: "He who believes in the advancement of man from some low organized form will naturally ask, How does this bear on the belief in the immortality of the soul? The barbarous races of man, as Sir J. Lubbock has shown, possess no clear belief of this kind; but arguments, derived from the primeval beliefs of savages, are, as we have just seen, of little or no avail. Few persons feel any anxiety from the impossibility of determining at what precise period in the development of the individual, from the first trace of a minute germinal vesical, man becomes an immortal being; and there is no greater cause for anxiety, because the period can not possibly be determined in the gradually ascending organic scale."

Surely it is a most pertinent inquiry, How does his theory of the advancement of man from some lower organized form bear on the immortality of the soul? and it is no answer to this inquiry to say that upon no hypothesis of man's origin can we determine at what precise period he becomes an immortal being. That the idea of an Omnipotent God, capable of creating a spiritual essence, or an immortal soul,

* "Origin of Species," p. 428, American edition, from the sixth English. New York: D. Appleton & Co., 1882.

is not denied by Mr. Darwin, is doubtless to be inferred from his strong affirmation that our minds refuse to accept as the result of blind chance the grand sequence of events which the birth both of the species and the individual presents to our view. That variations of structure, the union of pairs in marriage, the dissemination of seeds, and similar events, have all been ordained for some special purpose, is the hypothesis according to which he regards them as events brought about by the laws of natural selection, which laws were ordained by the Creator and left to operate. Now, while this hypothesis excludes, or tends to exclude, the idea of blind chance, it still remains to be considered whether the soul of man, or the essence which we call intellect, is in each case a direct creation of a special character, or whether it is a result from the operation of the laws which have been ordained for the action of organized matter. If it is the former, the soul may survive the destruction of the body. If it is the latter, the soul as well as all the other manifestations or exhibitions which the material body gives forth in its action, may and in all probability must cease with the organs whose action leads us falsely to believe that we are animated by an immortal spirit while we are in the flesh. If it is a necessary result of any theory that what is supposed to be the immortal soul of man is a product of the operation of certain laws imposed upon organized matter, without being a special creation of something distinct from matter, it is immaterial whether the organized form of matter with which the soul is connected, or appears to act for a time, was a special creation, or was an evolution out of some lower form, or came by blind chance. Nor is it material that we can not determine at what precise period in the genesis of the individual, by the ordinary process of reproduction, he becomes an immortal being. The question is, Does he ever become an immortal being, if in body and in mind he is a mere product of or-

ganized matter, formed from some lower type through the laws of variation and natural selection, resulting in an animal whose manifestations or exhibitions of what we call intellect or mind are manifestations of the same nature as the instincts of the lower animals, differing only in degree?

That I may not be misunderstood, and especially that I may not be charged with misrepresentation, I will state the case for the Darwinian theory as strongly as I can. The question here is obviously not a question of power. An Omnipotent Creator has just the same capacity to make special creations, by a direct and special exertion of his will, as he has to make one primordial type and place it under fixed laws that will in their operation cause a physical organization to act in such a way as to evolve out of it other and more or less perfect types. In either method of action, he would be the same Omnipotent God, by whose will all things would exist; and I assume that upon this point there is no difference between some of the evolution school and its opponents. But in considering the question of the origin of the human soul, or the intellect of man, we are dealing not with a question of power, but with the probable method in which the conceded Omnipotent capacity has acted. On the one hand, we have the hypothesis that the Eternal and Omnipotent capacity has created a spiritual and immortal being, capable of existing without any union with the body that is formed out of earthly material, but placed for a time in unison with such a body; and that for the effectual purpose of this temporary union this body has been specially constructed, and constructed in two related forms, male and female, so that this created species of animal may perpetuate itself by certain organic laws of reproduction. Now it is obviously immaterial that we can not detect the point of time, or the process, at or by which the union between the spiritual essence and the earthly body takes place in the generation

of the individual. It is conceded to be alike impossible to detect the time or mode in which descendants of the lower animals, which had nothing resembling intellect, become endowed with and inhabited by intellect, through the supposed laws of variation and natural selection, operating to produce an animal of a more elaborate organization. The point of divergence between the two hypotheses is precisely this: that the one supposes the mind of man to be a special creation, of a spiritual nature, designed to be immortal, but placed in union with a mortal body for a temporary purpose. The other hypothesis supposes no special creation of either the mind or the body of man, but maintains that the latter is evolved out of some lower animal, and that the former is evolved out of the action of physical organization.* Either mode of projecting and executing the creation of both the body and the mind of man is of course competent to an Omnipotent God. The question is, Which mode has the highest amount of probability on which to challenge our belief? If the one, as it is described, leads to the conclusion that the mind can not survive the body, and the other leads to the conclusion that it can, we are left to choose between them: and our choice must be determined by what we can discover of satisfactory proof that the mind of man was destined to become immortal. What, then, is the Darwinian theory of the origin of man as an animal, and to what does it lead respecting the origin and nature of the human soul?

Whoever will carefully examine Mr. Darwin's hypothe-

* Mr. Darwin refers to Mr. Herbert Spencer's theory of "the necessary acquirement of each mental power and capacity by gradation"; and indeed it is apparent that this class of philosophers have constructed a theory which denies the creation of the human mind as a spiritual essence, independent of matter, although some of them may adhere to the idea that it was God who caused matter to evolve out of its own action the substance or existence that we call mind.

sis of the descent of man as an animal, will find that commencing at a point opposite to that at which Plato began his speculations, the modern naturalist assumes the existence of a very low form of animated and organized matter, destitute of anything in the nature of reason, even if acting under what may be called instinctive and unconscious impulses, imposed upon it by the preordained laws by which animated matter is to act. By some process of generation, either bi-sexual or uni-sexual or non-sexual, this very low type of animal is endowed with a power of reproducing other individuals of the same structure and habits. In process of time, for which we must allow periods very much longer than those of which we are accustomed to think in relation to recorded history, the individuals of this species become enormously multiplied. A struggle for existence takes place between these very numerous individuals; and in this struggle there comes into operation the law to which Mr. Darwin has given the name of "natural selection," which is but another name for a series of events. He does not mean by this term to imply a conscious choice on the part of the animals, nor an active power or interfering deity. He employs it to express a constantly occurring series of events or actions, by which, in certain circumstances, animals secure themselves against the tendency to destruction which is caused by the great disparity between their numbers and the amount of food that is accessible to them, or by the unfavorable influences of a change of climate upon so great a body of individuals. He calls this series of events or actions *natural* selection, in order, as I understand, to compare what takes place in nature with what takes place when a breeder of animals purposely selects the most favorable individuals for the purpose of improving or varying the breed. In nature, the selection is supposed to operate as follows: The strongest and most active individuals of a species of animals have the best

chance of securing the requisite amount of food from the supply that is insufficient for all. They do this by their greater fleetness in overtaking the common prey, or by making war upon the more feeble or inactive of their fellows; and numerous individuals are either directly destroyed by this warfare, or are driven off from the feeding-ground and perish for want of nourishment. Thus the best specimens of the race survive; and to this occurrence is given the name of the "survival of the fittest," meaning the survival of those individuals best fitted to continue their own existence and to continue their species. A physical change in the country inhabited by a great multitude of individuals of a certain species, or by different species—for example, a change of climate—operates to make this struggle for existence still more severe, and the result would be that those individuals of the same species which could best adapt themselves to their new condition would tend to be preserved, as would the different species inhabiting the same country which could best maintain the struggle against other species. The improvement in the structure of the animals takes place, under this process of natural selection, in the following manner: The best individuals being preserved, the organs of which they make most use in the struggle for existence undergo development and slight modifications, favorable to the preservation of the individual, and these modifications are transmitted to their offspring. Here there comes in play a kind of collateral aid to which is given the name of "sexual selection," which is defined as a form of selection depending "not on a struggle for existence in relation to other organic beings or to external conditions, but on a struggle between individuals of one sex, generally the males, for the possession of the other sex."* "The result," continues Mr. Darwin, "is not death to the unsuccessful competitor,

* "Origin of Species," p. 69.

but few or no offspring. Sexual selection is, therefore, less rigorous than natural selection. Generally, the most vigorous males, those which are best fitted for their place in nature, will leave most progeny. But, in many cases, victory depends not so much on general vigor, as on having special weapons, confined to the male sex." As, by means of this warfare of sexual selection, the victor would always be allowed to breed, his courage and his special weapons of offense or defense, in their increased development, would descend to his offspring. Thus the improvement and modification induced by natural selection would be enhanced and transmitted by the sexual selection.*

In regard to the operation of the two kinds of selection in the evolution of man from a lower form of animal, we find the theory to be this: That organic beings with peculiar habits and structure have passed through transitions which have converted the primordial animal into one of totally different habits and structure; that, in these transitions, organs adapted to one condition and mode of life have become adapted to another; that such organs are homologous, and that in their widely varied uses they have been formed by transitional gradations, so that, for example, a floating apparatus, or swim-bladder, existing in a water-animal for one purpose—flotation—has become converted in the vertebrate animals into true lungs for the very different purpose of respiration. Thus, by ordinary generation, from an ancient and unknown prototype, not

* For the illustrations of both kinds of selection I must refer the reader to Mr. Darwin's works. In regard to birds, he makes the sexual selection operate less by the "law of battle" among the males, or by fighting, and more by the attractions of plumage and voice, by which the males carry on their rivalry for the choice of the females in pairing. But he attributes the same effect to the sexual selection in birds as in the other animals, namely, the transmission to offspring, and chiefly to the male offspring, of those peculiarities of structure which have given to the male parent the victory over his competitors.

only have organs, by minute and successive transitions, become adapted to changed conditions of life, but the whole organism has become changed, and this has resulted in the production of an animal vastly superior to his ancient and unknown prototype ; and yet to that prototype, of which we have no specimen and no record, are to be traced the germs of all the peculiarities of structure which we find in the perfect animals of different kinds that we thoroughly know, until we come to man, these successive results being brought about by the two kinds of selection—natural and sexual.

There can be no better illustration of the character of Mr. Darwin's theory than that to which he resorts when he means to carry it to its most startling length, while he candidly admits that he has felt the difficulty of this application of it far too keenly to be surprised at the hesitation of others. This illustration is the eye. Here he very justly says it is indispensable that reason should conquer imagination ; but on which side of the question reason or imagination is most employed might, perhaps, be doubtful. Mr. Darwin's hypothesis concerning the eye begins with the fact that in the highest division of the animal kingdom, the vertebrata, we can start from an eye so simple that it consists, as in the lancelet,* of a little sack of transparent skin, furnished with a nerve, and lined with pigment, but destitute of any other apparatus. From this prototype of a visual organ, up to the marvelous construction of the eye of man or of the eagle, he supposes that extremely slight and gradual modifications have led, by the operation of natural and sexual selection ; and by way of illustrating this development, he compares the formation of the eye to the formation of the telescope. "It is scarcely possible to avoid comparing the eye with a tele-

* A very low form of fish, without brain, vertebral column, or heart, classed by the older naturalists among the worms. ("Descent of Man," p. 159.) The technical name of the lancelet is *Amphioxus*.

scope. We know that this instrument has been perfected by the long-continued efforts of the highest human intellects, and we naturally infer that the eye has been formed by a somewhat analogous process. But may not this inference be presumptuous? Have we any right to assume that the Creator works by intellectual powers like those of man? If we must compare the eye to an optical instrument, we ought, in imagination, to take a thick layer of transparent tissue, with spaces filled with fluid, and with a nerve sensitive to light beneath, and then suppose every part of this layer to be continually changing slowly in density, so as to separate into layers of different densities and thickness, placed at different distances from each other, and with the surface of each layer slowly changing in form. Further, we must suppose that there is a power, represented by natural selection or the survival of the fittest, always watching each slight alteration in the transparent layers, and carefully preserving each which, under varied circumstances, in any way or in any degree, tends to produce a distincter image. We must suppose each new state of the instrument to be multiplied by the million, each to be preserved until a better one is produced, and then the old ones to be all destroyed. In living bodies variations will cause the slight alterations, generation will multiply them almost infinitely, and natural selection will pick out with unerring skill each improvement. Let this process go on for millions of years, and during each year on millions of individuals of many kinds, and may we not believe that a living optical instrument might thus be formed as superior to one of glass as the works of the Creator are to those of man? * *

It might have occurred to the very learned naturalist that the formation of a mechanical instrument by the hand of man, guided by his intellect, admits of varieties of that

* "Origin of Species," p. 146.

instrument for different purposes, as products of an intelligent will. Different kinds of telescopes for different uses have been produced, not by destroying the poorer ones and preserving the better ones, but by a special and intentional adaptation of the structure to special uses, until an instrument is made which will dissolve the nebulæ of the milky way, and bring within the reach of our vision heavenly bodies of the existence of which we had no previous knowledge. Why may not the same intelligent and intentional formation of the human eye, as a special structure adapted to the special conditions of such an animal as man, have been the direct work of the Creator, just as the lowest visual organ—that of such a creature as the lancelet—was specially made for the conditions of its existence? Why resort to the theory that all the intermediate varieties of the eye have grown successively out of the lowest form of such an organ by transitional grades of which we can not trace the series, when the probabilities concerning the varieties of this organ of which we have any knowledge are so strongly on the side of a special and intentional adaptation of each one to the circumstances of the animal to which it has been given? As a question of power in the Creator, either method of action was of course just as competent as the other. As a question of which was his probable method, the case is very different; for we know comparatively very little of the modifications produced by such causes as natural or even sexual selection, while we may, without presumption, assume that we know much more about the purposes of special adaptation to special conditions, which an omnipotent Creator may have designed and effected. But this is a digression, and also an anticipation of the argument.

To state the pedigree of man according to the Darwinian theory, we must begin with an aquatic animal as the early progenitor of all the vertebrata. This animal exist-

ing, it is assumed, "in the dim obscurity of the past," was provided with branchiæ or gills, or organs for respiration in water, with the two sexes united in the same individual, but with the most important organs of the body, such as the brain and heart, imperfectly or not at all developed. From this fish-like animal, or from some of its fish descendants, there was developed an amphibious creature, with the sexes distinct. Rising from the amphibians, through a long line of diversified forms, we come to an ancient marsupial animal, an order in which the young are born in a very incomplete state of development, and carried by the mother, while sucking, in a ventral pouch.* From the marsupials came the quadrumana † and all the higher mammals. ‡ Among these mammals there was, it is supposed, a hairy, tailed quadruped, probably arboreal in its habits, from which man is descended. It was an inhabitant of the Old World. It branched into the lemuridæ, a group of four-handed animals, distinct from the monkeys, and resembling the insectivorous quadrupeds in some of their characters and habits; § and from these came the simiadæ, of which there were two great stems—the New World and Old World monkeys. "From the latter, at a remote period, man, the wonder and glory of the universe, proceeded." ||

* The kangaroos and opossums are of this group.

† Animals with four hands.

‡ Animals which produce living young, and nourish them after birth by milk from the teats of the mother.

§ The lemur is one of a genus of four-handed mammals, allied to the apes, baboons, and monkeys, but with a form approaching that of quadrupeds.

|| "Descent of Man," p. 165.—The reader will need to observe that monkey is the popular name of the ape and the baboon. In zoölogy, monkey designates the animals of the genus *Simia*, which have long tails. The three classes are apes, without tails; monkeys, with long tails; baboons, with short tails.

The reader must now, in order to do justice to this theory, imagine a lapse of time, from the period of the existence of the aquatic progenitor of all the vertebrata, to be counted by millions of years, or by any figures that will represent to the mind the most conceivable distance between a past and a present epoch. Through this enormous stretch of centuries, in order to give scope to the operation of the laws of natural and sexual selection, we must suppose the struggle for existence to be going on among the individuals of the same species, and among different species inhabiting the same country, and the sexual selection among the individuals of the same species to be perpetually transmitting to offspring the improved and more developed organs and powers induced by natural selection ; so that in the countless sequence of generations there are evolved animals that are so widely different from their remote progenitors that in classifying them we find them to be new species, endowed with a power of reproducing their own type, and similarly capable, it would seem, of still further development into even higher types in the long-distant future.

I know not how it may appear to others, but to me the parallelism between the Platonic and the Darwinian theory is very striking. Both speculators assume the existence of a Supreme Intelligence and Power, presiding over the creation of animals which are to inhabit this earth. Behind the celestial or primitive gods the Greek philosopher places the Demiurgus, to whom the gods stand in the relation of ministers or servants to execute his will. The modern naturalist assumes the existence of the Omnipotent God ; and although he does not directly personify the laws of natural and sexual selection which the Omnipotent power has made to operate in nature, they perform an office in the transitional gradations through which the animals are successively developed, that very closely resembles the office

performed by the gods of Plato's system in providing the modifications of structure which the animals undergo. In the two processes the one is the reversed complement of the other. Plato begins with the formation of an animal of a very exalted type, and by successive degradations, induced by the failure of the animal to live up to the high standard of its rational existence, he supposes a descent into lower and still lower forms, the gods all the while providing a new structure for each successive lower form, until we reach the shell-fish fixed on the earth beneath the water. Darwin begins with the lowest form of animated organization, and by successive gradations induced by the struggle of the animal to maintain its existence, he supposes an ascent into higher and still higher forms, the laws of natural and sexual selection operating to develop a new structure for each successive higher form, until we reach man, "the wonder and glory of the universe," an animal whose immediate ancestor was the same as the monkey's, and whose remote progenitor was an aquatic creature breathing by gills and floating by a swim-bladder.

Nor had Plato less of probability to support his theory than Darwin had to support his. The Greek philosopher might have adduced the constant spectacle of men debasing their habits and even their physical appearance into a resemblance to the brutes. He might have suggested, and he does suggest, how the degrading tendencies of the lower appetites and the ravages of disease drag down the human frame from its erect carriage and its commanding power over matter to an approximation with the condition of the inferior animals. He might have adduced innumerable proofs of the loss of reason, or rationality, through successive generations of men, brought about by the transmission of both appetites and physical malformation from parents to children. He might have compared one of his Athenian fellow-citizens of the higher class with the lowest savage

known throughout all the regions accessible to an observer of his day and country. He might have portrayed the one as a being preserving his physical organization in the highest state of perfection by gymnastic exercises, by a well-chosen diet, by observance of all the conditions of health, by the aid of the highest medical skill known to the age ; cultivating his mind by philosophy, practicing every public and private virtue as they were understood among a people of rare refinement, and adorning his race by an exhibition of the highest qualities that were then attainable. All these qualities, physical, mental, and moral, Plato might have shown were transmissible in some degree, and in a good degree were actually transmitted from sire to son. Turning to the other picture, and comparing "Hyperion to the satyr," he might have shown that the lowest savage, in those physical points of structure which were best adapted to his animal preservation as an inhabitant of the wildest portion of the earth, had retained those which made him more nearly resemble the brute inhabitants of the same region, and that in his intellectual and moral qualities the resemblance between him and his Athenian contemporary was almost wholly lost. Intermediate between these extreme specimens of the human race, why could not Plato have found with great probability, and often with actual proof, successive degradations of structure and uses of organs, just as well supported by facts, or analogies, or hypotheses, as are Mr. Darwin's successive elevations from a lower to a higher animal ? If Plato had known as much about the animal kingdom as is now known, he could have arrayed the same facts in support of his theory, by an argument as powerful as that which now supports the doctrine of evolution.

Nay, it is certain that Plato's attention was drawn to some of these facts, and that he makes use of them in a way that is as legitimately a probable occurrence as any use

that is made of them at the present day. For example, he was struck with the existence of what in scientific parlance are called "rudiments," a term that is employed to describe an organ or part which appears to have no special use where it is found in one animal, but which, in a more developed or in a diversified condition, has an obvious use in another animal. Thus, he tells us that the gods, with a long-sighted providence, introduced a sketch or rudiment of nails into the earliest organization of man, foreseeing that the lower animals would be produced from the degeneration of man, and that to them claws and nails would be absolutely indispensable." * In the same way, he seems to regard hair as a rudiment, relatively speaking; for while its use on different parts of the body of man, or even on the head, is not very apparent, its use to the lower animals is very obvious. Why, then, is it not just as rational, and just as much in accordance with proper scientific reasoning, to suppose those parts of animal structure which are called "rudiments" to have been introduced as mere sketches in the organization of a very high animal, and then to have been developed into special uses in lower animals produced by the degeneration of the higher, as it is to suppose that they were developed in full activity and use in the lower animals, but sank into the condition of useless or comparatively useless appendages as the higher animal was evolved out of the lower by a process of elevation? The modern naturalist of the evolution school will doubtless say that "rudiments" in the human structure, for which there is no assignable use that can be observed, are not to be accounted for as sketches from which Nature was to work, in finding for them a use in some other animal in a developed and practically important condition; that, to the extent to which such things are found in man, they are proofs

* Grote, iii, p. 276.

of his cognate relations to the lower animals, in which they have a palpable use ; and that the gradations by which they have proceeded from practical and important uses in the lower animals, until they have become mere useless or comparatively useless sketches in the human structure, are among the proofs of the descent of man from the lower animals which had a use for such things. I shall endeavor hereafter to examine the argument that is derived from "rudiments" more closely. At present, the point which I suggest to the mind of the reader arises in the parallel between the Platonic and the Darwinian theory of the origin of the different species of animals. I ask, why is it not just as probably a true hypothesis to suppose that man was first created with these rudimentary sketches in his organization, and that they became useful appendages in the lower animals, into which man became degenerated, as it is to suppose that these parts existed in full development, activity, and practical use in the lower animals, out of whom man was generated, and that in man they lost their utility and became relatively mere rudiments? To my mind, neither theory has the requisite amount of probability in its favor compared with the probability of special creations ; but I can see as much probability in the Platonic as in the Darwinian explanation, and a strong parallelism between them.

I will pursue this parallel somewhat further by again adverting to Plato's idea of the origin of the human soul. He supposes it to have been an immortal being, formed out of the eternal essence of Ideas by the Demiurgus. He manifestly makes it an existence distinct from matter, because he places its first abode in a heavenly mansion, where it is in unison with the celestial harmonies and perfections of the outer circle. This heavenly sphere is again to be its abode, after it shall have been released from its temporary abode on earth, which has been appointed to it for purposes

of discipline and trial. At a fixed time of birth it is brought down from its celestial abode and united with a mortal body, that it may assert and prove its power to preside over and govern that body according to the eternal laws of reason and rectitude. If it fulfills this high duty, when the fastenings, which have bound it to the mortal frame, are dissolved with the dissolution of those which hold together the material structure, the soul flies away with delight to its own peculiar star. If it fails in this high duty, it is on the death of the first body transferred by a second birth into a more degraded body, resembling that to which it has allowed the first one to be debased. At length, somewhere in the series of transmigrations, the lower and bestial tendencies cease to have power over the immortal soul; the animal with which it was last united remains an animal bereft of reason, and the soul, released from further captivity, escapes to its original abode in the heavens, more or less contaminated by what it has undergone, but still immortal, indestructible, spiritual, and capable of purification.

Here, then, we have a conception of the origin and nature of the human soul as a spiritual existence, quite as distinctly presented as it can be by human reason. Stripped of the machinery by which Plato supposes the soul to have come into existence, his conception of its origin and nature is the most remarkable contribution which philosophy, apart from the aid of what is called inspiration, has made to our means of speculating upon this great theme. Of course, it affords, with all the machinery of which Plato makes use, no explanation of the point or the time of junction between the soul and the body. But, as a conception of what in the poverty of language must be called the substance of the soul, of its spiritual and immortal nature, of its distinctive existence separate from what we know as matter, whether Plato borrowed more or less from other philosophers who

preceded him, it is a very distinct presentation of the nature of the human mind.

Turn now to what can be extracted from the Darwinian theory of the origin and nature of the human mind, and observe where it holds with and where it breaks from the parallelism between it and the Platonic theory. The doctrine of evolution, so called, presents to us no distinct suggestion that the mind of man is a separate and special creation. Rejecting, and very properly rejecting, the Platonic idea of an existence of the human soul anterior to the birth of the individual, the Darwinian theory supposes that in the long course of time, during which natural and sexual selection were operating to produce higher and still higher animals, there came about, in the earlier and primitive organizations, a habit of the animal to act in a certain way; that this habit descended to offspring; that it became developed into what is now called instinct; and that instinct became developed into what we now call mind. I know not how otherwise to interpret Mr. Darwin's repeated affirmations that, in comparing the mental powers of man and those of the lower animals, there can be detected no difference in kind, but that the difference is one of degree only; that there is no fundamental difference, or difference in nature, between the mental powers of an ape and a man, or between the mental power of one of the lowest fishes, as a lamprey or lancelet, and that of one of the higher apes; that both of these intervals, that between the ape and man, and that between the lancelet and the ape, which are much wider in the latter case than in the former, are filled up by numberless gradations.* If this be true, it must be because the lancelet, supposing that animal to be the progenitor, formed a habit of acting by an implanted impulse, which became, under the operation of natural and sexual

* "Descent of Man," p. 65.

selection, confirmed, developed, and increased in its descendants, until it not only amounted to what is called instinct, but took on more complex habits until something akin to reason was developed. As the higher animals continued to be evolved out of the lower, this approach to a reasoning power became in the ape a true mental faculty; and, at length, in the numberless gradations of structure intermediate between the ape and the man, we reach those intellectual faculties which distinguish the latter by an enormous interval from all the other animals. "If," says Mr. Darwin, "no organic being, excepting man, had possessed any mental power, or if his powers had been of a wholly different nature from those of the lower animals, then we never should have been able to convince ourselves that our high faculties had been gradually developed. But it can be shown that there is no fundamental difference of this kind." *

I will not here ask how far this is theoretical assumption. I shall endeavor to examine in another place the evidence which is supposed to show that the mental powers of man are in no respect fundamentally different, or different in kind, from the powers in the other animals to which the distinguished naturalist gives the name of "mental" powers. At present I am still concerned with the parallelism between the Platonic and the Darwinian theory; and I again ask whether the latter is not the former reversed, in respect to the process by which reason in the one case becomes lost, and that by which in the other case it becomes developed out of something to which it bears no resemblance? Plato supposes the creation of pure reason, or mental power, in the shape—to use the counterpart of a physical term—of a non-physical, spiritual intelligence, or mind. It remains always of this nature, but the successive

* "Descent of Man," p. 65.

animals which it is required to inhabit on earth undergo such degradations that the immortal reason loses in them the power to control their actions ; nothing is left to govern in them but mere instinct, and this at last sinks into its lowest manifestations. Darwin, on the other hand, supposes the first creation to have been a very low animal of a fish-like structure, with the lowest capacity for voluntary action of any kind, but impelled to act in a certain way by superimposed laws of self-preservation ; that in the infinitude of successive generations these laws have operated to produce numberless gradations of structure, in the growth of which fixed habits have become complex instincts ; that further gradations have developed these instincts into something of mental power, as the successive higher animals have become evolved out of the lower ones, until at length the intellect of man has been “ gradually developed ” by a purely physical process of the action of organized matter.

This materialistic way of accounting for the origin of the human mind necessarily excludes the idea of its separate creation or its distinctive character. The theory is perfectly consistent with itself, in supposing that the mind of man does not differ in kind, or differ fundamentally, from those exhibitions which in the lower animals lead us to attribute to them some mental power. But whether the theory is consistent with what we know of our own minds, as compared with what we can observe in the other animals, is the real question. In the first place, it is to be remembered that we can read our own minds, by the power of consciousness and reflection. In the next place, it is conceded that we can know nothing of the minds of the other animals, excepting by their outward actions. They can not speak, to tell us of their emotions, their memories, their fears, their hopes, their desires, what they think, or whether they think at all. They do acts which wonderfully resem-

ble the acts of man, in outward appearance, as if they were acts which proceeded from the same power of reason but in a less perfect degree ; yet they can tell us nothing of their mental processes, if they have such processes, and the utmost that we can do is to argue from their acts that they have mental faculties akin to those of men. It is in the ordained nature of things that we know and can know, by introspection, what our own minds are. We can know the mind of no other animal excepting from his outward acts. How far these will justify us in assuming that his mind is of the same nature as ours, or that ours is an advanced development of his, is the fundamental question.

Plato was evidently led, by that study of the human mind which is open to all cultivated intellects through the process of consciousness and reflection, to conceive of the soul as a created intelligence of a spiritual nature. The fanciful materials out of which he supposes it to have been composed were the mere machinery employed to express his conception of its spiritual nature and its indestructible existence. He was led to employ such machinery by his highly speculative and constructive tendencies, and because it was the habit of Greek philosophy to account for everything. Some machinery he was irresistibly impelled to employ, in order to give due consistency to his theory. But his machinery in no way obscures his conception of the nature of the soul, and we may disregard it altogether and still have left the conception of a spiritual and immortal being, formed for separate existence from matter, but united to matter for a temporary purpose of discipline and trial.

The modern naturalist, on the other hand, although assuming the existence of the Omnipotent God, supposes the human mind to have become what it is by the action of organized matter beginning at the lowest point of animal life, and going on through successive gradations of animal structure, until habits are formed which become instincts,

and instincts are gradually developed into mind. Take away the machinery that is employed, and you have left no conception of the immortal and indestructible nature of the human soul. The material out of which it is constructed is all of the earth earthy, and the twofold question arises : first, whether this was the probable method employed by the Omnipotent Creator ; and, secondly, whether it will account for such an existence as we have reason to believe the mind of man to be.

There is another point in the parallel between the Platonic and the Darwinian systems which is worthy of note. We have seen that, according to Plato, when the Demiurgus had completed the construction of the Kosmos and that of the human soul, he retired and left to the gods the construction of a mortal body for man and of bodies of the inferior animals into which man would become degraded. According to Darwin, the Omnipotent God constructs some very low form of animal, and then, retiring from the work of direct creation, he leaves the laws of natural and sexual selection to operate in the production of higher animals through the process that is called evolution. Perhaps it may be unscientific to ask why the Omnipotent God should cease to exercise, or refrain from exercising, his power of special creation, after he has once exerted it. Perhaps there is some view of the nature and purposes of that infinite being which would render such an abstention from his powers a probable occurrence. But it is difficult to conceive what this view can be. If we take a comprehensive survey of all the facts concerning the animal kingdom that are within the reach of our observation ; and if, then, in cases where we know of no intermediate or transitional states, we assume that they must have existed ; if we array the whole in support of a certain theory which undertakes to account both for what we see and for what we do not see, we very easily reach the conclusion that the Omnipotent God

performed but one act of special creation, or at most performed but a very few of such acts, and those of the rudest and simplest types, and then left all the subsequent and splendid exhibitions of animal structure to be worked out by natural selection. This is the scientific method adopted by the evolution school to account for the existence of all the higher animals of which we have knowledge, man included. It may be very startling, but we must acknowledge it as the method of action of the Omnipotent God, because it is said there is no logical impossibility in it.

There is a passage in Mr. Darwin's "Origin of Species" which I must now quote, because it shows how strongly the supposed action and abstention of the infinite Creator, according to the Darwinian theory, resembles the action and abstention of Plato's Demiurgus: "Although the belief that an organ so perfect as the eye could have been formed by natural selection, is enough to stagger any one; yet in the case of any organ, if we know of a long series of gradations in complexity, each good for its possessor; then, under changing conditions of life, there is no logical impossibility in the acquirement of any conceivable degree of perfection through natural selection. In the cases in which we know of no intermediate or transitional states, we should be extremely cautious in concluding that none can have existed, for the metamorphoses of many organs show what wonderful changes in function are at least possible. For instance, a swim-bladder has apparently been converted into an air-breathing lung. The same organ having performed simultaneously very different functions, and then having been in part or in whole specialized for one function; and two distinct organs having performed at the same time the same function, the one having been perfected while aided by the other, must often have largely facilitated transitions."

Here, then, we have it propounded that after the creation

of the rudest and simplest form of a visual organ, the infinite God abstains from direct and special creation of such a perfect and elaborate organ as the human eye, and leaves it to be worked out by natural selection ; there being no logical impossibility, it is said, in this hypothesis. We are cautioned not to conclude, because we can not find the intermediate and transitional states of the visual organs, that they never existed ; we are told that they are at least possible, and that analogies show they must have existed ; and from the possibility of their existence and from the assumption that they happened, we are to believe that the Omnipotent God, refraining from the exercise of his power to create the human eye, with its wondrously perfect structure, left it to be evolved by natural selection out of the rudest and simplest visual organ which he directly fashioned.

All things are possible to an infinite Creator. He who made the visual organ of the lowest aquatic creature that ever floated could make the human eye as we know it, or could make one that would do more than the eye of man ever was capable of. He could by a direct exercise of his power of creation form the eye of man, or he could leave it to be evolved out of the only type of a visual organ on which he saw fit to exercise his creative power. He could create in the land-animals a true air-breathing lung as a special production of his will, or could permit it to be formed by transitional gradations out of the swim-bladder of an aquatic creature. But why should he abstain from the one method and employ the other ? This question brings us at once to the probabilities of the case ; and, in estimating those probabilities, we must take into the account all that reason permits us to believe of the attributes of the Almighty. We can not, it is true, penetrate into his counsels without the aid of revelation. But if we confine ourselves to the domain of science, or to the mere observation of nature, we shall find reason for believing that the

Omnipotent God had purposes in his infinite wisdom that render the acts of special creation vastly more probable than the theory of evolution. A study of the animal kingdom and of all the phenomena of the universe leads us rationally and inevitably to one of two conclusions: either that there is no God, and that all things came by chance; or to the belief that there is a God, and that he is a being of infinite benevolence as well as infinite wisdom and power. Now, why should such a being, proposing to himself the existence on earth of such an animal as man, to be inhabited for a time by a soul destined to be immortal, abstain from the direct creation of both soul and body, and leave the latter to be evolved out of the lowest form of animal life, and the former to become a mere manifestation or exhibition of phenomena, resulting from the improved and more elaborate structures of successive types of animals? Is there no conceivable reason why an infinitely wise, benevolent, and omnipotent being should have chosen to exercise the direct power of creation in forming the soul of man for an immortal existence, and also to exercise his direct power of creation in so fashioning the body as to fit it with the utmost exactness to be serviceable and subservient to the mind which is to inhabit it for a season? Why depict the infinite God as a quiescent and retired spectator of the operation of certain laws which he has imposed upon organized matter, when there are discoverable so many manifest reasons for the special creation of such a being as man? It is hardly in accordance with any rational theory of God's providence, after we have attained a conception of such a being, to liken him intentionally or unintentionally to the Demiurgus of the acute and ingenious Greek philosopher. We must conclude that human society, with all that it has done or is capable of doing for man on earth, was in the contemplation of the Almighty; and if we adopt this conclusion, we must account for the moral

sense, for moral obligation, and for the idea of law and duty. We can not account for these things upon any probable theory of their origin, if we reject the idea that they were specially implanted in the structure of the human soul, and suppose that both the intellectual faculties and the moral sense were evolved out of the struggle of lower animals for their existence, resulting in the formation of higher animals and in the development of their social instincts into more complex, refined, and consciously calculating instincts of the same nature.

I have not drawn this parallel between the Platonic and the Darwinian theories of the origin of different animals for any purpose of suggesting that the one was in any sense borrowed from the other. Plagiarism, in any form, is not, so far as I know, to be detected in the writings of the evolution school. But the speculations of Plato in regard to the origin and nature of the human soul, fanciful as they are, afford great assistance in grasping the conception of a spiritual existence ; and the parallel between his process of degradation and Darwin's process of elevation shows to my mind as great probability in the one theory as there is in the other.

CHAPTER III.

The Darwinian pedigree of man—The evolution of organisms out of other organisms, according to the theory of Darwin.

It is doubtless an interesting speculation to go back in imagination to a period to be counted by any number of millions of years, or covered by an immeasurable lapse of time, and to conceive of slowly-moving causes by which the present or the past inhabitants of this globe became developed out of some primordial type, through successive generations, resulting in different species, which became final products and distinct organisms. But what the imagination can do in the formation of a theory when acting upon a certain range of facts is, as a matter of belief, to be tested by the inquiry whether the weight of evidence shows that theory to be, in a supreme degree, a probable truth, when compared with any other hypothesis. It is in this way that I propose to examine and test the Darwinian pedigree of man. The whole of Mr. Darwin's theory of the descent of man as an animal consists in assigning to him a certain pedigree, which traces his organism through a long series of other animals back to the lowest and crudest form of animal life ; and it must be remembered that this mode of accounting for the origin of man of necessity supposes an unbroken connection of lives with lives, back through the whole series of organisms which constitute the pedigree, and that, according to the Darwinian theory, there was no aboriginal creation of any of these organisms, save the very first and lowest form with which the series com-

mences. Not only must this connection of lives with lives be shown, but the theory must be able to show how it has come about that there are now distinct species of animals which never reproduce any type but their own.

Two great agencies, according to the Darwinian theory, have operated to develop the different species of animals from some low primordial type, through a long series which has culminated in man, who can not lay claim to be a special creation, but must trace his pedigree to some ape-like creature, and so on to the remote progenitor of all the *Vertebrata*. It is now needful to grasp, with as much precision as such a theory admits of, the nature and operation of these agencies, and to note the strength or weakness of the proof which they afford of the main hypothesis. First, we have what is called "the struggle for existence," which may be conceded as a fact, and to which more or less may be attributed. The term is used by Mr. Darwin in a metaphorical sense, to include all that any being has to encounter in maintaining its individual existence, and in leaving progeny, or perpetuating its kind. In the animal kingdom, the struggle for individual existence is chiefly a struggle for food among the different individuals which depend on the same food, or against a dearth of one kind of food which compels a resort to some other kind. The struggle for a continuation of its species is dependent on the success with which the individual animal maintains the contest for its own existence. Now, it is argued that in this great and complex battle for life it would occur that infinitely varied diversities of structure would be useful to the animals in helping them to carry on the battle under changing conditions. These useful diversities, consisting of the development of new organs and powers, would be preserved and perpetuated in the offspring, through many successive generations, while the variations that were injurious would be rigidly destroyed. The animals in whom these favor-

able individual differences and variations of structure were preserved would have the best chance of surviving and of procreating their kind. So that, by this "survival of the fittest," Nature is continually selecting those variations of structure which are useful, and continually rejecting or eliminating those which are injurious ; the result being the gradual evolution of successive higher types of animals out of the lower ones, until we reach man, the highest animal organism that exists on this earth. In the next place, we have, as an auxiliary agency, in aid of natural selection, what is called "the sexual selection," by which the best endowed and most powerful males of a given species appropriate the females, and thus the progeny become possessed of those variations of structure and the superior qualities which have given to the male parent the victory over his competitors.

The proofs that are relied upon to establish the operation and effect of these agencies in producing the results that are claimed for them, ought to show that, in one or more instances, an animal of a superior organization which, when left to the natural course of its reproduction by the union of its two sexes, always produces its own distinct type and no other, has, in fact, been itself evolved out of some lower and different organism by the agencies of natural and sexual selection operating among the individuals of that lower type. One of the proofs, on which great stress is laid by Mr. Darwin, may be disposed of without difficulty. It is that which is said to take place in the breeding of domestic animals, or of animals the breeding of which man undertakes to improve for his own practical benefit, or to please his fancy, or to try experiments. In all that has been done in this kind of selection, in breeding from the best specimens of any class of animals, there is not one instance of the production of an animal varying from its near or its remote known progenitors in anything but adventitious peculiarities which will not warrant us in regard-

ing it as a new or different animal. No breeder of horses has ever produced an animal that was not a horse. He may have brought about great and important improvements in the qualities of fleetness, or strength, or weight, or endurance, by careful selection of the sire and the dam; but the race-horse or the hunter, or the draught-horse or the war-horse, is but a horse of different qualities and powers, with the same skeleton, viscera, organs, muscles, which mark this species of animal, and with no other variations of structure than such as follow from the limited development of different parts for different uses. No breeder of cows ever produced a female animal that was not a cow, although he may have greatly improved the quality and quantity of the milk peculiar to this animal by careful selection of the individuals which he permits or encourages to breed. No breeder of sheep ever produced an animal that was not a sheep, although the quality of the fleece or of the mutton may have been greatly improved or varied. Among the domestic fowls, no animal that was not a bird was ever bred by any crossing of breeds, although great varieties of plumage, structure of beak, formation of foot, development of wing, habits of life, adaptation to changes of situation, and many minor peculiarities, have been the consequences of careful and intelligent breeding from different varieties of the same fowl. In the case of the pigeon, of which Mr. Darwin has given a great many curious facts from his own experience as a breeder, the most remarkable variations are perhaps to be observed as the results of intentional breeding from different races of that bird; but with all these variations nothing that was not a bird was ever produced. In the case of the dog, whatever was his origin, or supposing him to have been derived from the wolf, or to belong to the same family as the wolf, it is, of course, impossible to produce, by any crossing of different breeds of dogs, an animal that would not belong to the class of the *Canidæ*.

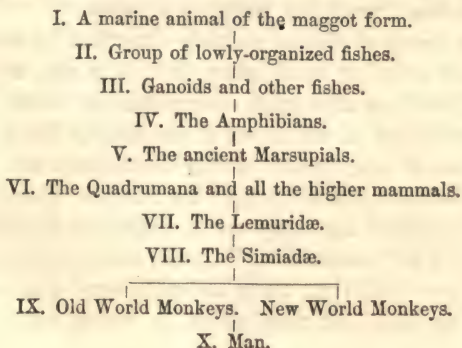
Indeed, it is conceded by Darwin, with all the array of facts which he adduces in regard to the domesticated animals, that by crossing we can only get forms in some degree intermediate between the parents; and that although a race may be modified by occasional crosses, if aided by careful selection of the individuals which present the desired character, yet to obtain a race intermediate between two distinct races would be very difficult, if not impossible. If this is so, how much more remote must be the possibility, by any selection, or by any crossing to which Nature will allow the different animals to submit, to produce an animal of so distinct a type that it would amount to a different species from its known progenitors!

From all that has been brought about in the efforts of man to improve or to vary the breeds of domestic animals—a kind of selection that is supposed to be analogous to what takes place in Nature, although under different conditions—it is apparent that there are limitations to the power of selection in regard to the effects that are to be attributed to it. A line must be drawn somewhere. It will not do in scientific reasoning, or in any other reasoning, to ignore the limitations to which all experience and observation point with unerring certainty, so far as experience and observation furnish us with facts. It is true that the lapse of time during which there has been, with more or less success, an intentional improvement in the breeds of domestic animals carried on with recorded results has been very short when compared with the enormous period that has elapsed since the first creation of an animal organization, whenever or whatever that creation was. But history furnishes us with a pretty long stretch of time through which civilized, half-civilized, and savage nations have had to do with various animals in first taming them from a wild state and then in domesticating so as to make them subservient to human wants, and finally in improving their

breeds. But there is no recorded or known instance in which there has been produced under domestication an animal which can be said to be of a different species from its immediate known progenitors, or one that differed from its remote known progenitors in any but minor and adventitious peculiarities of structure. If in passing from what has been done by human selection in the breeding of animals to what has taken place in Nature in a much longer space of time and on a far greater scale, we find that in Nature, too, there are limitations to the power of that agency which is called natural selection—that there is an impassable barrier which Nature never crosses, an invincible division between the different species of animals—we must conclude that there is a line between what selection can and what it can not do. We must conclude, with all the scope and power that can be given to natural selection, that Nature has not developed a higher and differently organized animal out of a lower and inferior type—has not made new species by the process called evolution, because the infinite God has not commissioned Nature to do that thing, but has reserved it unto himself to make special creations. Do not all that we know of the animal kingdom—all that naturalists have accumulated of facts and all that they concede to be the absence of facts—show that there is a clear and well-defined limitation to the power of natural selection, as well as to the power of that other agency which is called sexual selection? Grant that this agency of natural selection began to operate at a period, the commencement of which is as remote as figures can describe; that the struggle for life began as soon as there was an organized being existing in numbers sufficiently large to be out of proportion to the supply of food; that the sexual selection began at the same time, and that both together have been operating ever since among the different species of animals that have success-

ively arisen and successively displaced each other throughout the earth. The longer we imagine this period to have been, the stronger is the argument against the theory of evolution, because the more numerous will be the absences of the gradations and transitions necessary to prove an unbroken descent from the remote prototype which is assumed to have been the first progenitor of the whole animal kingdom. Upon the hypothesis that evolution is a true account of the origin of the different animals, we ought practically to find no missing links in the chain. The fact is that the missing links are both extremely numerous and important; and the longer the period assumed—the further we get from the probability that these two agencies of natural and sexual selection were capable of producing the results that are claimed for them—the stronger is the proof that a barrier has been set to their operation, and the more necessary is it to recognize the line which separates what they can from what they can not do.

Let us now see what is the state of the proof. It may assist the reader to understand the Darwinian pedigree of man if I present it in a tabulated form, such as we are accustomed to use in exhibiting to the eye the pedigree of a single animal. Stated in this manner, the Darwinian pedigree of man may be traced as follows :



These ten classes or groups of animals are supposed to be connected together by intermediate diversified forms, which constitute the transitions from one of the classes or groups to the other; and in reading the table downward it must be remembered that we are reading in fact through an ascending scale of beings, from the very lowest organized creature to the highest. The whole, taken together, forms a chain of evidence; and, according to the rational rules of evidence, each distinct fact ought to be proved to have existed at some time before our belief in the main hypothesis can be challenged. I know of no reason why the probable truth of a scientific hypothesis should be judged by any other rules of determination than those which are applied to any other subject of inquiry; and, while I am ready to concede that in matters of physical science it is allowable to employ analogy in constructing a theory, it nevertheless remains, and must remain, true that where there are numerous links in a supposed chain of proofs that are established by nothing but an inference drawn from an analogous fact, the collection of supposed proofs does not exclude the probable truth of every other hypothesis but that which is sought to be established, as it also does not establish the theory in favor of which the supposed facts are adduced. Upon these principles of evidence I propose now to examine the Darwinian pedigree of man.

I. The group of marine animals described as resembling the larvæ of existing Ascidians; that is to say, an aquatic animal in the form of a grub, caterpillar, or worm, which is the first condition of an insect at its issuing from the egg. These assumed progenitors of the Vertebrata are reached, according to Mr. Darwin, by "an obscure glance into a remote antiquity," and they are described as "apparently" existing, and as "resembling" the larvæ of existing Ascidians. We are told that these animals were provided with branchiæ, or gills, for respiration in water, but with the

most important organs of the body, such as the brain and heart, imperfectly or not at all developed. This simple and crude animal "we can see," it is said, "in the dim obscurity of the past," and that it "must have been the early progenitor of all the Vertebrata."* It is manifest that this creature is a mere hypothesis, constructed, no doubt, by the aid of analogy, but existing only in the eye of scientific imagination. Why is it placed in the water? For no reason, apparently, but that its supposed construction is made to resemble that of some creatures which have been found in the water, and because it was necessary to make it the progenitor of the next group, the lowly-organized fishes, in order to carry out the theory of the subsequent derivations. It might have existed on the land, unless at the period of its assumed existence the whole globe was covered with water. If it had existed on the land, the four subsequent forms, up to and including the Marsupials, might have been varied to suit the exigencies of the pedigree without tracing the descent of the Marsupials through fishes and the Amphibians.

II. The group of lowly-organized fishes. These are said to have been "probably" derived from the aquatic worm (I), and they are described to have been as lowly organized as the lancelet, which is a known fish of negative characters, without brain, vertebral column, or heart, presenting some affinities with the Ascidians, which are invertebrate, hermaphrodite marine creatures, permanently attached to a support, and consisting of a simple, tough, leathery sack, with two small projecting orifices. The larvæ of these creatures somewhat resemble tadpoles, and have the power of swimming freely about. These larvæ of the Ascidians are said to be, in their manner of development, related to the Vertebrata in the relative position of

* "Descent of Man," pp. 164, 609.

the nervous system, and in possessing a structure closely like the *chorda dorsalis* of vertebrate animals.* Here, again, it is apparent that a group of lowly-organized fish-like animals, of which there are no remains, have been constructed by a process of scientific reasoning from a certain class of marine creatures that are known. As a matter of pure theory, there can be no serious objection to this kind of construction, especially if it is supported by strong probabilities furnished by known facts. But when a theory requires this kind of reasoning in order to establish an important link in a chain of proofs, it is perfectly legitimate and necessary criticism that we are called upon to assume the former existence of such a link ; and, indeed, the theorists themselves, with true candor and accuracy, tell us that they are arguing upon probabilities from the known to the unknown, or that a thing "must have existed" because analogies warrant the assumption that it did exist. In a matter so interesting, and in many senses important, as the evolution theory of man's descent, it is certainly none too rigid to insist on the application of the ordinary rules of belief.

III. The Ganoids and other fishes like the *Lepidosiren*. These, we are told, "must have been developed" from the preceding (II). The Ganoids, it is said, were fishes covered with peculiar enameled bony scales. Most of them are said to be extinct, but enough is known about them to lay the foundation for their "probable" development from the first fishes that are supposed to have been derived from the aquatic worm (I). There is a reason for arguing the existence of these first fishes as a true fish with the power of locomotion, because the next ascending group of animals is to be the Amphibians. In a fish, the swim-bladder is an important organ ; and it is an organ that plays an important part in the Darwinian theory, furnishing, it is claimed,

* "Descent of Man," p. 159.

a very remarkable illustration that an organ constructed originally for one purpose, flotation, may be converted into one for a widely different purpose, namely, respiration. As the Amphibians, which as a distinct group were to come next after the fishes in the order of development, must be furnished with a true air-breathing lung, their progenitors, which inhabited the water only, must be provided with an organ that would undergo, by transitional gradations, conversion into a lung. But what is to be chiefly noted here is that it is admitted that the prototype, which was furnished with a swim-bladder, was "an ancient and unknown prototype"; and it is a mere inference that the true lungs of vertebrate animals are the swim-bladder of a fish so converted, by ordinary generation, from the unknown prototype because the swim-bladder is "homologous or 'ideally similar' in position and structure with the lungs of the higher vertebrate animals."* One might ask here without presumption, why the Omnipotent God should not have created in the vertebrate animals a lung for respiration, as well as have created or permitted the formation of a swim-bladder in a fish; and looking to the probabilities of the case, it is altogether too strong for the learned naturalist to assert that "there is no reason to doubt that the swim-bladder has actually been converted into lungs or an organ used exclusively for respiration"; especially as we are furnished with nothing but speculation to show the intermediate and transitional modifications between the swim-bladder and the lung. While we may not assume "that the Creator works by intellectual powers like those of man," in all respects, it is surely not presumptuous to suppose that an Omnipotent and All-wise Being works by powers that are competent to produce anything that in his infinite purposes he may see fit specially to create.

* "Origin of Species," p. 148.

IV. The Amphibians. Here we come to what is now a very numerous group, of which it is said that the first specimens received, among other modifications, the transformation of the swim-bladder of their fish progenitors into an air-breathing lung. We are told that from the fishes of the last preceding group (III) "a very small advance would carry us on to the Amphibians." * But whether the advance from an animal living in the water and incapable of existing out of that element, to an animal capable of living on the land as well as in the water, was small or large, we look in vain, at present, for the facts that constitute that advance.

V. The Ancient Marsupials. These were an order of mammals such as the existing kangaroos, opossums, etc., of which the young, born in a very incomplete state of development, are carried by the mother, while sucking, in a ventral pouch. They are supposed to have been the predecessors, at an earlier geological period, of the placental mammals, namely, the highest class of mammals, in which the embryo, after it has attained a certain stage, is united to the mother by a vascular connection called the *placenta*, which secures nourishment that enables the young to be born in a more complete state. There is a third and still lower division of the great mammalian series, called the *Montremata*, and said to be allied to the Marsupials. But the early progenitors of the existing Marsupials, classed as the Ancient Marsupials, are supposed to constitute the connection between the Amphibians and the placental mammals; that is to say, an animal which produced its young by bringing forth an egg, from which the young is hatched, became converted into an animal which produced its young from a womb and nourished it after birth from the milk supplied by its teats, the young being born

* "Descent of Man," p. 165.

in a very incomplete state of development and carried by the mother in a ventral pouch while it is sucking. The steps of variation and development by which this extraordinary change of structure, of modes of reproduction and formation of organs, as well as habits of life, took place, are certainly not yet discovered ; and it is admitted, in respect to forms "now so utterly unlike," that the production of the higher forms by the process of evolution "implies the former existence of links binding closely together all these forms." * In other words, we are called upon to supply by general reasoning links of which we have as yet no proof.

VI. The *Quadrumana* and all the higher (or Placental) Mammals. These are supposed to stand between the implacental mammals (V) and the *Lemuridæ* (VII). The latter were a group of four-handed animals, distinct from the monkeys, and "resembling the insectivorous quadrupeds." But the gradations which would show the transformation from the implacental Marsupials to the placental *Quadrumana* are wanting.

VII. The *Lemuridæ*. This branch of the placental mammals is now actually represented by only a few varieties. The early progenitors of those which still exist are placed by Darwin in the series intermediate between the *Quadrumana* and the *Simiadæ* ; and according to Huxley they were derived from the lowest, smallest, and least intelligent of the placental mammalia.

VIII. The *Simiadæ*. This is the general term given by naturalists to the whole group of monkeys. From the *Lemuridæ* to the *Simiadæ* we are told by Darwin that "the interval is not very wide." Be it wider or narrower, it would be satisfactory to know whether the gradations by which the former became the latter are established by anything more than general speculation.

* "Descent of Man," p. 158.

IX. The Catarrhine, or Old-World Monkeys. These are the great stem or branch of the Simiadæ which became the progenitors of man. His immediate progenitors were "probably" a group of monkeys called by naturalists the Anthropomorphous Apes, being a group without tails or callosities, and in other respects resembling man. While this origin of man is gravely put forward and maintained with much ingenuity, we are told that "we must not fall into the error of supposing that the early progenitor of the whole Simian stock, including man, was identical with, or even closely resembled, any existing ape or monkey."* So that somewhere between the early progenitor of the whole Simian stock and all that we know of the monkey tribe, there were transitions and gradations and modifications produced by natural and sexual selection which we must supply as well as we can.

X. Man. We have now arrived at "the wonder and glory of the universe," and have traced his pedigree from a low form of animal, in the shape of an aquatic worm, through successive higher forms, each developed out of its predecessor by the operation of fixed laws, and without the intervention of any special act of creation anywhere in the series, whatever may have been the power and purpose by and for which existence was given to the first organized and living creature, the aquatic worm. Speaking of man as belonging, from a genealogical point of view, to the Catarrhine, or Old-World stock of monkeys, Mr. Darwin observes that "we must conclude, however much the conclusion may revolt our pride, that our early progenitors would have been properly thus designated."†

I have already said that our pride may be wholly laid out of consideration. The question of the probable truth of this hypothesis of man's descent should not be affected

* "Descent of Man," p. 155.

† Ibid.

by anything but correct reasoning and the application of proper principles of belief. Treating it with absolute indifference in regard to the dignity of our race, I shall request my readers to examine the argument by which it is supported, without the smallest influence of prejudice. I am aware that it is asking a good deal to desire the reader to divest himself of all that nature and education and history and poetry and religion have contributed to produce in our feelings respecting our rank in the scale of being. When I come to treat of that which, for want of a more suitable term, must be called the substance of the human mind, and to suggest how it bears upon this question of the origin of man, I shall, as I trust, give the true, and no more than the true, scope to those considerations which lead to the comparative dignity of the race. But this dignity, as I have before observed, should follow and should not precede or accompany the discussion of the scientific problem.

What has chiefly struck me in studying the theory of evolution as an account of the origin of man is the extent to which the theory itself has influenced the array of proofs, the inconsequential character of the reasoning, and the amount of assumption which marks the whole argument. This is not said with any purpose of giving offense. What is meant by it will be fully explained and justified, and one of the chief means for its justification will be found in what I have here more than once adverted to—Mr. Darwin's own candor and accuracy in pointing out the particulars in which important proofs are wanting. Another thing by which I have been much impressed has been the repetition of what is "probable," without a sufficient weighing of the opposite probability; and sometimes this reliance on the "probable" has been carried to the verge, and even beyond the verge, of all probability. Doubtless the whole question of special creations on the one hand and of gradual evo-

lution on the other is a question of probability. But I now refer to a habit among naturalists of asserting the probability of a fact or an occurrence, and then, without proof, placing that fact or occurrence in a chain of evidence from which the truth of their main hypothesis is to be inferred. It is creditable to them as witnesses, that they tell us that the particular fact or occurrence is only probably true, and that we are to look for proof of it hereafter. But the whole theory thus becomes an expectant one. We are to give up our belief that God made man in his own image—that he fashioned our minds and bodies after an image which he had conceived in his infinite wisdom—because we are to expect at some future time to discover the proof that he did something very different ; that he formed some very lowly-organized creature, and then sat as a retired spectator of the struggle for existence, through which another and then another higher form of being would be evolved, until the mind and the body of man would both have grown out of the successive developments of organic structure. We can not see this now ; we can not prove it ; but we may expect to be able to see it and to prove it hereafter.

The present state of the argument does not furnish very strong grounds for the expectation of what the future is to show. As far as I can discover, the main ground on which the principle of evolution is accepted by those who believe in it, is general reasoning. It is admitted that there are breaks in the organic chain between man and his nearest supposed allies which can not be bridged over by any extinct or living species. The answer that is made to this objection seems to me a very singular specimen of reasoning. It is said that the objection will not appear of much weight to those who believe in the principle of evolution from general reasons. But how is it with those who are inquiring, and who, failing to feel the force of the “general reasons,” seek to know what the facts are ?

When we are told that the breaks in the organic chain "depend merely on the number of related forms which have become extinct," is it asking too much to inquire how it is known that there were such forms and that they have become extinct? Geology, it is fully conceded on its highest authorities, affords us very little aid in arriving at these extinct forms which would connect man with his ape-like progenitors; for, according to Lyell, the discovery of fossil remains of all the vertebrate classes has been a very slow and fortuitous process, and this process has as yet reached no remains connecting man with some extinct ape-like creature.* The regions where such remains would be most likely to be found have not yet been searched by geologists. This shows the expectant character of the theory, and how much remains for the future in supplying the facts which are to take the place of "general reasons."

But perhaps the most remarkable part of the argument remains to be stated. The breaks in the organic chain of man's supposed descent are admitted to be of frequent occurrence in all parts of the series, "some being wide, sharp, and defined, others less so in various degrees."† But these breaks depend merely, it is said, upon the number of related forms that have become extinct, there being as yet no proof, even by fossil remains, that they once existed. Now, the prediction is that at some future time such breaks will be found still more numerous and wider, by a process of extinction that will be observed and recorded; and hence we are not to be disturbed, in looking back into the past, by finding breaks that can not be filled by anything but general reasoning. The passage in which this singular kind of reasoning is expressed by Mr. Darwin deserves to be quoted:

"At some future period, not very distant as measured

* "Descent of Man," pp. 156, 157.

† Ibid., p. 156.

by centuries, the civilized races of man will almost certainly exterminate and replace the savage races throughout the world. At the same time the anthropomorphous apes, as Prof. Schaafhausen has remarked, will no doubt be exterminated. The break between man and his nearest allies will then be wider, for it will intervene between man in a more civilized state, as we may hope, even than the Caucasian, and some ape as low as the baboon, instead of as now between the negro or Australian and the gorilla.”*

I do not quite comprehend how the “more civilized state of man” in the more or less remote future is to lead to this wider break. One can understand how the whole of mankind may become more civilized, and how the savage races will disappear by extermination or otherwise. It may be, and probably will be, that the anthropomorphous apes will be exterminated at the same time. But the question here is not in regard to a more perfect and widely diffused civilization—a higher and universal elevation of the intellectual and moral condition of mankind, a more improved physical and moral well-being—but it is in regard to a change in the physical and organic structure of the human animal, so marked and pronounced as to produce a wider break between man and his nearest supposed allies than that which now exists between the negro or the Australian and the gorilla. The anthropomorphous ape existing now will have disappeared; but it will be a well-known and recorded animal of the past. But what reason is there to expect that natural and sexual selection, or the advance of civilization, or the extermination of the savage races of mankind, or all such causes combined, are going to change essentially the structure of the human body to something superior to or fundamentally different from the Caucasian individual? We have had a tolerably long recorded history of the human

* “Descent of Man,” p. 156.

body as it has existed in all states of civilization or barbarism. And although in the progress from barbarism to civilization—if utter barbarism preceded civilization—the development of its parts has been varied, and the brain especially has undergone a large increase in volume and in the activity of its functions, we do not find that the plan on which the human animal was constructed, however we may suppose him to have originated, has undergone any material change.

The most splendid specimen of the Caucasian race that the civilized world can show to-day has no more organs, bones, muscles, arteries, veins, or nerves than those which are found in the lowest savage. He makes a different use of them, and that use has changed their development, and to some extent has modified stature, physical, intellectual, and moral, and many other attributes; as climate and habits of life have modified complexion, the diseases to which the human frame is liable, and many other peculiarities. But if we take historic man, we find that in all the physical features of his animal construction that constitute him a species, he has been essentially the same animal in all states of civilization or barbarism; and unless we boldly assume that the prehistoric man was an animal born with a coat of hair all over his body, and that clothing was resorted to as the hair in successive generations disappeared, we can have no very strong reason for believing that the human body has been at any time an essentially different structure from what it is now. Even in regard to longevity or power of continued life, if we set aside the exceptional cases of what is related of the patriarchs in the biblical records, we do not find that the average duration of human life has been much greater or much less than the threescore and ten or the fourscore years that are said to have been the divinely appointed term. As to what may have been the average duration of life among prehistoric men, we are altogether in the dark.

I must now revert to one of the most prominent of the admitted breaks in the Darwinian pedigree, namely, that which occurs at the supposed transition from the amphibians to the mammalia. There is a term which is used in mechanics to mark the characteristic and fundamental distinction between one complex machine and another. We speak of the "principle" on which a mechanical structure operates, meaning the essential construction and mode of operation which distinguish it from other machines of the same general class. Although we are not to forget that an animal organization, to which is given that mysterious essence that is called life, may come into being by very different processes from those which are employed by man in dealing with dead matter and the forces which reside in it, yet there is no danger of being misled into false analogies, if we borrow from mechanics a convenient term, and speak of the "principle" on which an animal is constructed and on which its animal organization operates. We find, then, that in the animal kingdom there is a perfectly clear and pronounced division between the modes in which the reproductive system is constructed and by which it operates in the continuation of the species. The principle of construction and operation of the reproductive system, by which an individual animal is produced from an egg brought forth by the female parent, and is thereafter nourished without anything derived from the parental body, is as widely different from that by which the young animal is born from a womb and nourished for a time from the milk of the mother, as any two constructions, animate or inanimate, that can be conceived of. Whatever may be the analogy or resemblance between the embryo that is in the egg of one animal and the embryo that remains in the womb of another animal, at the point at which the egg is expelled from the parental system the analogy or resemblance ceases. In certain animals a body that is called an egg is formed

in the female parent, containing an embryo, or foetus, of the same species, or the substance from which a like animal is produced. This substance is inclosed in an air-tight vessel or shell; when this has been expelled from the parent the growth of the embryo goes on to the stage of development at which the young animal is to emerge from the inclosure, and, whatever may have been the process or means of nourishment surrounding the embryo within the shell and brought in that inclosure from the body of the parent, the young animal never derives, at any subsequent stage of its existence, either before or after it has left the shell, anything more from the parental system. It may be "hatched" by parental incubation or by heat from another source, but for nourishment, after it leaves the shell, the young animal is dependent on substances that are not supplied from the parental body, although they may be gathered or put within its reach by the parental care.

The transition from this system of reproduction to that by which the foetus is formed into a greater or less degree of development within the body of the parent, and then brought forth to be nourished into further development by the parental milk, is enormous. The principle of the organic construction and mode of perpetuating the species, in the two cases, is absolutely unlike after we pass the point at which the ovule is formed by the union of the male and the female vesicles that are supposed to constitute its substance. When we pass from the implacental to the placental mammals we arrive at the crowning distinction between the two great systems of reproduction which separates them by a line that seems to forbid the idea that the one has grown out of the other by such causes as natural selection, and without a special and intentional creation of a new and different mode of operation. On the one hand, we have a system of reproduction by which the ovule is brought forth from the body of the parent in an inclosed

vessel, and thereafter derives nothing from the parental body. In the other, we have the ovule developed into the foetus within the body of the parent, and the young animal is then brought forth in a more or less complete state of development, to be nourished by the parental secretion called milk. The intervention of the placental connection between the foetus and the mother, whereby nourishment is kept up so that the young animal may be born in a more complete state of development, is a contrivance of marvelous skill, which natural selection, or anything that can be supposed to take place in the struggle for existence, or the result of the sexual battle, seems to be entirely inadequate to account for. If two such very diverse systems could be supposed to have been the product of human contrivance, we should not hesitate to say that the principle of the one was entirely different from that of the other, and that the change evinced the highest constructive skill and a special design.

The Darwinian hypothesis is that this great transition from the one system of reproduction to the other took place between the amphibians and the ancient marsupials, by the operation of the influences of natural and sexual selection. That is to say, the system of reproduction through an egg, which is the characteristic of the amphibians, became changed by gradations and modifications into the system of the lowest mammals, the distinction between the former and the latter being an obvious and palpable one. Then we are to suppose a further change from the marsupials, or the implacental mammals, to that wonderful contrivance, the *placenta*, by which the mother nourishes the foetus into a more complete state of development before the young animal is born. This enormous change of system is supposed to have been brought about by a struggle among the individuals of one species for food, aided by a struggle between the males of that species for

the possession of the females, by the growth and development of organs useful to the animal in the two battles, and by the transmission of these enhanced powers and improved weapons to offspring, and possibly by the crossing of different varieties of the new animals thus produced. But what potency there could be in such causes to bring about this great change it is extremely difficult to imagine, and we must draw largely on our imaginations to reach it. It would seem that if there is any one part of animal economy that is beyond the influence of such causes as the "survival of the fittest," it is the reproductive system, by which the great divisions of the animal kingdom continue their respective forms. Give all the play that you can to the operation of the successful battle for individual life, and to the victory of the best-appointed males over their competitors for the possession of the females, and to the transmission of acquired peculiarities to offspring—when you come to such a change as that between the two systems of reproduction and perpetuation, you have to account for something which needs far more proof of the transitional gradations of structure and habits of life than can now be found between the highest of the amphibians and the lowest of the mammalia. I know not how there could be higher or stronger evidence of design, of a specially planned and intentionally elaborated construction, than is afforded by this great interval between the one reproductive system and the other. But it is time now to pass to those points of resemblance between man and the other mammals which are asserted as the decisive proofs of his and their descent from some pre-existing form, their common progenitor. These points of resemblance may be considered in the following order :

1. *The Bodily Structure of Man.*—He is notoriously constructed on the same general type or model as other mammals. "All the bones in his skeleton can be com-

pared with corresponding bones in a monkey, bat, or seal. So it is with his muscles, nerves, blood-vessels, and internal viscera. The brain, the most important of all the organs, follows the same law." *

2. *The Liability of Man to certain Diseases to which the Lower Animals are liable.*—These diseases, such as hydrophobia, variola, the glanders, syphilis, cholera, etc., man both communicates to and receives from some of the lower animals. "This fact proves the close similarity of their tissues and blood, both in minute structure and composition, far more plainly than does their comparison under the best microscope or by the aid of the best chemical analysis." Monkeys are liable to many of the same non-contagious diseases as we are, such as catarrh and consumption. They suffer from apoplexy, inflammation of the bowels, and cataract in the eye. Their young die from fever when shedding their milk-teeth. Medicines produce the same effect on them as on us, and they have a strong taste for tea, coffee, spirituous liquors, and even tobacco. Man is infested with both internal and external parasites of the same genera or families as those infesting other mammals; in the case of scabies, he is infested with the same species of parasites. He is subject to the same law of lunar periods, in the process of gestation, and in the maturation and duration of certain diseases. His wounds are repaired by the same process of healing, and, after the amputation of his limbs, the stumps occasionally possess some power of regeneration, as in the lowest animals. †

3. *The Reproductive Process.*—This is strikingly the same, it is said, in all mammals, from the first act of courtship by the male to the birth and nurturing of the young. ‡ The closeness of the parallel here, however, is obviously between man and the other placental mammalia, if we re-

* "Descent of Man," p. 6.

† Ibid., p. 8.

‡ Ibid.

gard the whole process of reproduction of the different species.

4. *Embryonic Development*.—From the human ovule, which is said to differ in no respect from the ovule of other animals, into and through the early embryonic period, we are told that the embryo of man can hardly be distinguished from that of other members of the vertebrate kingdom. It is not necessary to repeat the details of the resemblance, which are undoubtedly striking, because they show a remarkable similarity between the embryo of man and that of the dog and the ape, in the earlier stage of the development, and that it is not until quite in the later stages of development that the three depart from each other, the difference between the young human being and the ape being not so great as that between the ape and the dog. We may, of course, accept Prof. Huxley's testimony that "the mode of origin [conception?] and the early stages of the development of man are identical with those of the animals immediately below him in the scale; without a doubt, in these respects, he is far nearer to the apes than the apes are to the dog." *

5. *Rudiments*.—This is a somewhat obscure branch of the proofs, which requires a more detailed examination in order to appreciate its bearing on the general theory of evolution. A distinction is made between rudimentary and nascent organs. The former are absolutely useless to their possessor—such as the mammæ of male quadrupeds, or the incisor teeth of ruminants, which never cut through the gums—or else they are of such slight service to their present possessors that they can not be supposed to have been developed under the conditions which now exist. These useless, or very slightly useful, organs in the human frame, are supposed to have been organs which had an important

* "Descent of Man," pp. 9, 10, quoting Huxley, "Man's Place in Nature," p. 65.

utility in the lower animals from which man is descended, but, by disuse at that period of life when the organ is chiefly used, and by inheritance at a corresponding period of life, they became of less and less utility in the successive animals that were evolved out of the preceding forms, until they sank into the condition of useless appendages, although perpetuated by force of the derivation of one species of animal from another, caused by the operation of the laws of natural and sexual selection. Nascent organs, on the other hand, are those which, though not fully developed to their entire capability, are of high service to their possessor, and may be carried to a higher degree of utility. One of the characteristics, as it is said, of rudimentary organs, is that they often become wholly suppressed in individuals, and then reappear occasionally in other individuals, through what is called reversion, or a return to ancestral peculiarities.* We are told that "not one of the higher animals can be named which does not bear some part in a rudimentary condition ; and man forms no exception to the rule." †

Among the rudiments that are peculiar to man, and which are supposed to be proofs of his cognate relations to the lower animals, we are referred to certain muscles in a reduced condition, which in the other animals are used to move, twitch, or contract the skin, and remnants of which, in an efficient state, are found in various parts of our bodies ; for instance, the muscles which raise the eyebrows, those which contract the scalp, those which, in some individuals, move the external ear, and similar muscular powers in different parts of the body. These are adduced as illustrations of the persistent transmission of an absolutely useless, or almost useless, faculty, "probably" derived from our remote semi-human progenitors. There is also another

* "Descent of Man," p. 11 *et seq.*

† *Ibid.*

rudiment in man, found in the covering of the eye, and called by anatomists the "semi-lunar fold," which in birds is of great functional importance, as it can be rapidly drawn across the whole eyeball. In those animals in which, with its accessory muscles and other structures, it is well developed, as in some reptiles and amphibians, and in sharks, it is a third eyelid. In the two lower divisions of the mammalian series, the monotremata and the marsupials, and in some few of the higher mammals, as in the walrus, it is said to be fairly well developed. But in man, in the quadrumana, and most other mammals, it has become a mere rudiment.

The sense of smell in man is also classed by Darwin and other naturalists among the rudiments. It is argued that it was not originally acquired by man as he now exists, but that he has inherited this power, in an enfeebled and so far rudimentary condition, from some early progenitor, to whom it was highly serviceable, and by whom it was continually used.

Then we have the rudiment of hair, which, so far as it now exists on different parts of our body, is regarded as a mere remnant of the uniform hairy coat of the lower animals. Man, as he is now born, "differs conspicuously from all the other primates in being almost naked." But this nearly nude condition was not, it is said, the condition of his progenitors, and it is not the condition of his co-descendants from the same progenitors. At some time the progenitors of man and his co-descendants became covered all over with a coat of hair. What remains upon our bodies of this peculiar growth, that is called hair, is what was left after the agency of natural selection had worked off what was useless to the successive animals, and sexual selection had operated to transmit to offspring the absence of hair that had accrued in the nearer progenitors and the immediate parents. The illustrations which render this view "probable" do not need to be repeated, nor is it necessary

to follow out the speculations concerning the mode in which our progenitors, near or remote, became varied in respect to the quantity, position, or direction of the hairs on various parts of their bodies.

There are several other alleged homologues or rudiments which are supposed to connect man with the lower animals, but which, whatever may be the resemblances, it is not necessary to discuss in detail, because there is one consideration at least which applies to the whole of this class of proofs, and to that I now pass. The three great classes of facts on which the whole argument rests, viewing man as an animal and omitting all reference to his intellect, are the resemblances of his bodily structure to that of the other mammals, the similarity between his embryonic development and theirs, and the rudiments. I reserve for separate discussion the counter-proof which may be derived from the nature of the human mind, and the special adaptation of the human structure to become the temporary residence and instrument of a spiritual and immortal being.

“It is,” says Mr. Darwin, “no scientific explanation to assert that they have all [man and the other animals of the mammalian class] been formed on the same ideal plan.”* The similarity of pattern is pronounced “utterly inexplicable” upon any other hypothesis than that all these animals are descended from a common progenitor, and that they have become what they are by subsequent adaptation to diversified conditions. I may incur some risk in undertaking to suggest what is a “scientific” explanation. Certainly I do not propose to “assert” anything. But I will endeavor to keep within the bounds of what I suppose to be science. I take that to be a scientific explanation which, embracing the important facts of natural history

* “Descent of Man,” p. 24. Consult Mr. Darwin’s note on Prof. Bianconi’s explanation of homologous structures upon mechanical principles, in accordance with their uses.

as the groundwork of the reasoning, undertakes to show the rationality of one hypothesis that differs from another, when the question is, Which has the greater amount of probability in its favor?

All correct reasoning on this subject of man's descent as an animal begins, I presume, with the postulate of an Infinite Creator, having under his power all the elements and forms of matter, organized and unorganized, animate and inanimate. There is no fundamental difference of opinion on this point, as I understand, between some of the evolutionists and their opponents.* Omnipotence, boundless choice of means and ends, illimitable wisdom, a benevolence that can not fail and can not err, are the conceded attributes of the being who is supposed to preside over the universe; and, however difficult it may be for us to express a conception of infinite power and infinite wisdom, as it is to describe infinite space and duration, we know what we mean to assume when we speak or think of faculties that are without limit, and of moral qualities that are subject to no imperfection. It is true that we have no means of forming an idea of superhuman and infinite power but by a comparison of our own limited faculties with those which we assume to belong to an eternal and infinite God. But the nature of our own limited powers teaches us that there may be powers that are as far above ours as the heavens are above the earth, as the endless realms of space stretch beyond and forever beyond any measurable distance, as eternity stretches beyond and forever beyond all measurable time. At all events, the postulate of an infinite God is the one common starting-point for the scientists of the evolution school and those who accept their doctrine, and for those who dissent from it. If I did not assume this, I could not go one step further, for with-

* Mr. Herbert Spencer's peculiar views are not here included in the discussion, but they will be considered hereafter.

out it there could not be a basis for any reasoning on the subject that would lead anywhere but to the conclusion that all that exists came by blind chance. This conclusion is rejected alike by the scientists, whose views I am now examining, and by those who differ from them.

In the economy of Nature, which is but another term for the economy of the Omnipotent Creator, there is no waste of power, as there is no abstention from the exercise of power, where its exertions are needed to accomplish an end. By this I mean that when a general plan of construction is found carried out through a variety of organizations, the rational inference is that so much power has been exerted as was needful to accomplish in each organization the objects that are common to all of them, and that no more power has been used in that direction. But where a special adaptation in some one variety of the same class of constructions is needful to accomplish an object peculiar to a new variety, the necessary amount of power never fails to be exerted. A study of the animal kingdom reveals this great truth, as palpably as a study of the products of human skill reveals the fact that man, from the imperfection of his faculties, is constantly exerting more or less power than was needful in his efforts to produce a new variety in his mechanical constructions. Experience and accumulated knowledge enable us to carry a general plan of construction through a considerable group of mechanical forms; but it is when we endeavor to vary the principle of construction so as to produce a new and special mode of operation, that we either waste power in repeating the general plan or fail to exercise the amount of power necessary to adapt the general plan to the introduction of the special object at which we are aiming. Our success in making such adaptations is often wonderful, but our failures evince that our imperfect faculties do not always enable us to accomplish the necessary adaptations of the gen-

eral plan of construction to the special objects which we wish to attain. To the Infinite Creator, all such difficulties are unknown. He neither wastes power by new plans that are unnecessary, nor makes "vain repetitions," nor fails to exert the requisite amount of power and wisdom in the introduction of new and special contrivances which he ingrafts upon or superadds to the general plan, and which he has devised for the accomplishment of a new object. With a boundless choice of means and ends, with a skill that can not err, with a prescience that sees the end from the first conception of the design, he can repeat the general plan throughout any variety of constructions without any waste of power, and can introduce the new adaptations or contrivances which are to constitute a new construction, by the exercise of all the power that is required to accomplish a special object. Whether we are to suppose that he does this by the establishment of certain laws which he leaves to operate within prescribed limits, or does it by special creations proceeding from direct and specific exertions of his will, the question of his power to employ the one method or the other remains always the same. The question of which was his probable method depends upon the force of evidence; and upon this question we must allow great weight to the fact which all Nature discloses, namely, that the Creator does not waste power by making new plans of construction where an existing plan may be usefully repeated, and that he does not fail to exercise the necessary power when he wishes to add to the general plan of construction a new and special organism for a particular purpose.

Is there anything presumptuous in thus speaking of the determination and purposes of the Omnipotent Creator? We have his existence and infinite attributes conceded as the basis of all sound reasoning on his works. Why then should we not infer his purposes and his acts from his works? Why should we not attribute to him a special

design, when we can not examine his works without inferring such special design, unless we conclude that the most amazing and peculiar constructions grew up under the operation of causes of which we have no sufficient proof, and in the supposed result of which there are admitted chasms that can not be bridged over?

To return now to the resemblance between the bodily structure of man and that of his supposed progenitors. The assertion is that a repetition of the same general plan of construction throughout a class of animals can only be explained upon the hypothesis of their descent from a common progenitor. They are, it is claimed, co-descendants from some one ancient animal; and however they may differ from each other, in all these co-descendants from that animal we find the same general plan of construction, the same ideal model repeated. Among the whole class of the higher mammals, we have skeletons, muscles, nerves, blood-vessels, internal viscera, organs, that closely correspond. What does this prove but that there was no waste of power, because there was no necessity in making man, for the formation of a general plan of construction different in these particulars from that which was employed in making the monkey, the bat, or the seal? The similarity of pattern between the hand of a man or a monkey, the foot of a horse, the flipper of a seal, or the wing of a bat, is pronounced "utterly inexplicable" upon any hypothesis but that of descent from a common progenitor. But why is not this sameness of ideal plan just as consistent with the hypothesis that the same ideal plan would answer for the human hand or the hand of an ape, the foot of the horse, the flipper of the seal, or the wing of the bat? * It

* It is immaterial, of course, in this discussion, whether the formation of man preceded that of the other animals, according to the Platonic idea, or whether, as in the account given in the book of Genesis, the other animals were first formed. So far as an ideal plan entered into all of them,

is when you pass from such resemblances and come to the special contrivances which separate one animal from another by a broad line of demarkation, that you are to look for the adaptation of special contrivances to repetitions of the same ideal model through the varying species. Take, for example, the introduction among the mammals of the placental system of reproduction, parturition, and subsequent nourishment of the young, combined with the nourishment of the foetus while it continues in the body of the mother. This system would require no material variation from the general plan of construction that is common to the different mammals of this class in respect to the parts where the resemblances are kept up throughout the series, such as those of the skeleton, muscles, nerves, viscera, and other organs that are found in all of them. But for the introduction of this peculiar system of reproduction and continuation of the species, there was needful a special and most extraordinary contrivance. If such a contrivance or anything like it had been produced by human skill, and been introduced into a mechanical structure, we should not hesitate to say that there had been an invention of a most special character. When you follow this system through the different animals in which it is found operating, and find that the period of gestation and of suckling is varied for each of them, that for each there is the necessary modification of trunk, situation of the organs, assimilation of food and formation of milk, and many other peculiarities, what are you to conclude but that there has been an adaptation of a new system to a general plan of construction, and that while the latter remains substantially the same, it has had ingrafted upon or incorporated with it a most singular contrivance, so original, comprehensive, and flexible, that its characteristic principle admits of the most exact

that plan may have been devised for and first applied to any part of the series, and then varied accordingly.

working in animals that are as far asunder as man and the horse, or as the horse and the seal, or as the seal and the bat?

The resemblances between the embryonic development of man and the other mammals present another instance of the constantly occurring fact that there has been no waste of power on the one hand, and on the other no failure to exert the amount of power requisite to produce a new variation of the general principle. There is no more logical force in the hypothesis of a common progenitor, in order to account for these resemblances, than there is in the hypothesis that the general system of embryonic development was first devised, and that it was then varied in each distinct animal according to the requirements of its special construction. Upon the latter supposition, there would be resemblances to a certain stage, and then there would follow the departures which we have no difficulty in tracing. Upon the former supposition we should expect to find, what we actually do find, that it is very difficult, if not impossible, to assign any reason for the departures, or to suggest how it has happened that one animal is so absolutely distinct from another. Thus, to begin with the embryo itself, and to trace it through its stages of development, we find that in man it can hardly be distinguished from that of other members of the vertebrate kingdom. This we should expect to be the case after we have learned the great fact that Nature operates upon a uniform principle up to the point where variations and departures are to supervene. The system of embryonic development being devised to operate in parallel lines through all the placental mammals until the lines should begin to depart from each other so as to result in animals of different species, would necessarily show strong resemblances of structure until the departures supervened. There would be, in other words, a strong illustration of the truth that in the Divine economy

there is no waste of power. But when the stage is reached at which the departures may be noted, and the lines diverge into the production of organized beings differing widely from each other, we reach an equally striking illustration of the corresponding truth that the amount of power necessary to produce very different results never fails to be put forth. There is no good reason why this latter exertion of power should not be attributed to special design just as logically and rationally as we must attribute to intentional purpose and infinite skill the general system of embryonic development which has been made for the whole class of the placental mammals. While, therefore, we may accept as a fact Prof. Huxley's statement on this branch of comparative anatomy, we are under no necessity to accept his conclusion. To the question whether man originates in a different way from a dog, bird, frog, or fish, this anatomist answers, as already quoted: "The reply is not doubtful for a moment; without question, the mode of origin and the early stages of the development of man are identical with those of the animals immediately below him in the scale; without a doubt, in these respects he is far nearer to apes than apes are to the dog." This refers, of course, to the parallelism that obtains in the early stages of the embryonic development. It necessarily implies, at later stages, diverging lines, which depart more or less from each other, and thus we have between the ape and the man a nearer approach than we have between the ape and the dog. But how does this displace, or tend to displace, the hypothesis of a general system of embryonic development for all animals of a certain class, and an intentional and special variation of that system so as to produce different species of animals? The identity between the mode of origin and the early stages of the development of man and those of the animals immediately below him in the scale, is strong proof of the applicability of the same

general principle of development throughout all the animals of a certain class. The cessation of the parallelism at the diverging lines is equally strong proof of a design to create an animal differing as man does from the ape, or as the ape does from the dog. The argument that these three species are co-descendants from a common progenitor, viewing man simply as an animal, is at least no stronger than the argument which leads to the conclusion of special creations.

The same thing may be said of the liability of man to certain contagious or non-contagious diseases in common with some of the lower animals. That there is a similarity in the chemical composition of the blood of an entire class of animals, in the structure of their tissues and blood-vessels, so that they are subject to the same causes of inflammation or to the same parasites, is proof of a uniform plan of the fluids and the vascular system, or, in other words, it evinces that here, too, there has been in these respects no waste of power in forming the different animals of the same class. But trace back the supposed pedigree of the animals sharing this chemical composition of the blood, character of tissues, and vascular system, until you have passed through the amphibians and reached their supposed fish progenitors. Somewhere between the fishes and the higher mammals, you have not only a great change in the chemical composition of the blood-vessels and tissues, but an equally great change in the apparatus by which the blood is oxygenated.* How can these changes have been brought about without a new and intentional structure of the vessels and the apparatus for supplying the oxygen demanded for the continuation of life? How can we explain these changes by such agencies as the natural selec-

* The popular terms—"fish" and "flesh"—present to the mind the most vivid idea of this change from the characteristic substance of one of these animals to that of another.

tion which is supposed to lead to the "survival of the fittest," and the sexual selection which is supposed to give to the best-appointed males of a given species the power to transmit to their offspring the new peculiarities which they have acquired through successive generations? Do not these changes show that there is a line of division which such agencies alone can not cross? Do they not clearly point to the exercise of the creative power in a special manner, and for special purposes? That power being once exercised, the new chemical composition and mechanical appliances being devised, the same "ideal plan" could be carried through a new class of animals by a repetition which is in accordance with the economy of Nature, and which an infinite power could adapt to the formation of animals, each of which was designed to perpetuate its own species and no other. Hence we should expect to find in the animals sharing in the same formation of the blood and the vascular system a corresponding process of healing the parts severed by a wound, and a continuous secretion from such vessels as have not been cut away; but we should not expect to find the stumps growing into a new and perfect part, to take the place of what has been removed by amputation.* We should expect to find the same drugs affecting different animals of the same class alike; and when the nervous system of a class of animals is upon the same general plan, we should expect to find them similarly affected by stimulants. But these resemblances do not militate very strongly against the hypothesis of special creations, when we consider that it is according to the universal economy of the Omnipotent Creator to employ the necessary, and no more than the necessary, power in originating a plan that may be applied to the formation of

* See the note on amputation, or severance of parts, at the end of this chapter.

a distinct class of beings, and that his adaptations of this plan to further and specific constructions of beings belonging to a general class, but differing widely from each other, are among the strongest and plainest proofs of his infinite power and the nature of his methods.

In regard to the "rudiments" that are found in man, the theory of Mr. Darwin can be best stated in his own words: "In order to understand the existence of rudimentary organs, we have only to suppose that a former progenitor possessed the parts in question in a perfect state, and that under changed habits of life they became greatly reduced, either from simple disuse or through the natural selection of those individuals which were least encumbered with a superfluous part, aided by the other means previously indicated."* But, in order to do justice to this theory, it is necessary to repeat the description and operation of the supposed agencies of natural and sexual selection. Natural selection is an occurrence which takes place among the individuals of a certain species in the struggle for existence, whereby those who are best appointed secure the necessary supply of food, and the weaker or less active are either directly destroyed in the contest or perish for want of nourishment. The "fittest" having survived, they have the best chance of procreating their kind, and are likely to have the most progeny. To these individuals there comes in aid the sexual selection, which means chiefly the victory of the fittest males over their less fit competitors for the possession of the females. Whatever peculiarities of structure or development, or diminution of structure or development, these fittest males possess, they would transmit to their offspring. This tendency would be enhanced by the varying conditions of life through which the successive generations might have to pass; so that if the former pro-

* "Descent of Man," p. 25.

genitor possessed naturally an organ in a perfect state, but ceased to make use of it, and for thousands of generations its use went on diminishing, it would sink into the condition of a mere rudiment. Supposing this to be a partially true explanation of the modes in which organs become rudimentary, how does it militate against the idea of separate creations? We have "only to suppose" that the first men possessed, for example, the power of moving the skin all over their bodies by the contraction of certain muscles, and that their remote descendants lost it everywhere excepting in a few parts, where it remains in an efficient state, and that it has become varied in different individuals. The process by which organs become rudimentary is an hypothesis just as consistent with the separate creation of man as it is with his being a co-descendant from some lower animal whose descendants branched into men, apes, horses, seals, bats, etc.; for, on the supposition of the separate creation of all these different animals, each species might have been originally endowed with this power of muscular contraction of the skin, and in their descendants it might have been retained or varied or have become more or less rudimentary, according to its utility to the particular species. The truth is, that our own faculties of creation or construction, when we undertake to deal with matter and its properties, are so imperfect, and that which constitutes living organisms is so utterly beyond our reach, that we do not sufficiently remember how entirely it is within the compass of the infinite Power, which has given to matter all the properties that it possesses and has living organisms under its absolute control, to form a system of construction and operation for beings of entirely distinct characters, carrying it through each of them in parallel lines, or causing it to diverge into varying results with an economy that neither wastes the constructive power nor fails to exert it where it is needed. To argue that the presence of rudi-

ments in different animals, in different comparative states of development or efficiency, or in a purely useless condition, can only be explained by a descent from some remote common progenitor, is what the logicians call a *non sequitur*. It overlooks the illimitable faculty of the creating Power, and disregards the great fact that such a power acts by an economy that is saving where uniformity will accomplish what is intended, that is profuse where variation is needful, and that can guide its own exertions of power, or its abstention from such exertions, by unerring wisdom, to the most varied and exact results.

I trust that by the use of the term "economy" in speaking of what is observable in the works of the Creator, I shall be understood as comprehending both the avoidance of unnecessary and the exertion of all necessary power. Of the degree of necessity in any exercise of a power which we suppose to be infinite, we can only judge by what we can see. If omnipotence and omniscience are to be predicated of the being who is supposed to preside over the universe, it is rational to conclude, from all that we can discover, that, in applying a uniform system of construction to different animals of a certain general class, he acted upon a principle that his unerring faculties enabled him to see was a comprehensive one; and that in producing variations of that system of construction that would result in adapting its uniformity to the varying conditions of the different species, he acted by the same boundless wisdom and power. If these postulates of the Divine attributes are conceded, rudiments do not by any means necessarily lead to the conclusion that all the animals of a certain class are co-descendants from some remote common progenitor, for they do not exclude the hypothesis that each distinct animal was formed upon a general plan of construction that could be applied throughout the class, but that it was varied according to the special conditions of its intended being. Organs or

parts may thus have become more or less rudimentary without resorting to the supposition of a common progenitor for the whole class. That supposition, indeed, makes it necessary to assume that the infinite Creator fashioned some one animal, and then, abstaining from all work of further direct creation, left all the other animals to be evolved out of that one by the operation of secondary causes that fail even as a theory to account for what we see, and that can not be traced through any results that have yet been discovered. Wherever we pause in the ascending scale of the Darwinian descent of man, wherever we place the first special act of creative power, whether we put it at the fish-like animal of the most remote antiquity, and call that creature the original progenitor of all the vertebrata, or whether we suppose a special creation to have occurred at the introduction of the mammalian series, or anywhere else, we have to account for changes of system, new constructions, elaborately diversified forms, by the operation of agencies that were incapable of producing the results, if we are to judge of their capacity by anything that we have seen or known of their effects.

I will conclude this chapter by expressing as accurately as I can what has struck me as the excessive tendency of modern science to resolve everything into the operation of general laws, or into what we call secondary causes. I may be able to suggest nothing new upon this part of the subject, but I shall at least be able, I hope, to put my own mind in contact with that of the reader by explaining what has impressed me in the speculations of those who lay so much stress upon the potency of general laws to produce the results which we see in Nature. Of course, I do not question the great fact that the infinite Power acts by and through the uniform methods from which we are accustomed to infer what we call laws ; which in physics is nothing but a deduction of regularity and system from that

which we see to be perpetually and invariably happening. Now, I do not enter here into the question of the tendency of modern science to displace our religious ideas of a special Providence, by attributing everything in Nature to the operation of fixed laws of matter ; or its tendency, in other words, to remove the infinite Being at a greater distance from us than that in which our religious feelings like to contemplate him. I am perfectly sensible that in truth the infinite God is just as near to us, when we regard him as acting by general laws and secondary causes, as when we believe him to be exercising a direct and special power. I am equally sensible that it is in the very nature of infinite power, wisdom, and benevolence to be able and willing to ordain uniform and fixed principles of action. That Power which gives to matter all its properties may well be supposed to have established uniformity and regularity of movements, forces, combinations, and qualities. How supremely consistent this uniformity and regularity are, with what stupendous accuracy they are kept forever in operation, we are more or less able to discern ; and that benevolence which is believed to accompany the power may well be supposed to have intended that its intelligent and rational creatures should be able in some degree to discover and to avail themselves of these unvarying laws of the physical world. But are these laws to be supposed to be the only methods by which the infinite Will has ever acted ? Is it to be assumed that, having settled and established these perpetual principles, on which matter, organized or unorganized, is to act, he leaves everything to their operation and abstains from all further exertion of his creative power for any special purpose ? Has he given to these general laws a potency to produce, in and of themselves, all the results ? In other words, has he affixed to their operation no limitations, or has he set bounds to them, and reserved to himself, by direct, specific, and occasional exercise of his will and power,

for new purposes, to produce results for which the general laws were not ordained ?

It is not necessary here to enter into the consideration of what are called "miracles." These, in their true meaning, are special interpositions, which the Divine Power is supposed to make, by a suspension or interruption of the established laws of Nature ; and, whatever may be the grounds of our belief or our unbelief in such occurrences, they are not exercises of power such as those which are supposed to take place in special creations of new beings. That the hypothesis of special creations of new beings involves no interruption or displacement of the fixed laws of Nature, is quite manifest.

NOTE A.

NOTE ON AMPUTATION, OR SEVERANCE OF PARTS.—As Mr. Darwin attached some importance to a fact which he asserted respecting the efforts of Nature to restore a part of an organism which has been severed by amputation, I think it well to quote his statement, and to point out what I believe to be an inaccuracy. His statement is this: "His [man's] wounds are repaired by the same process of healing, and the stumps left after the amputation of his limbs, especially during an early embryonic period, occasionally possess some power of regeneration, as in the lowest animals." It is not quite apparent what he means by amputation during an early embryonic period. If he is to be understood as referring to a case of complete severance of any part of an embryo before birth, it has not been demonstrated that such a severance has been followed by a successful effort of Nature to replace the severed part ; and it is difficult to understand how there could be such an amputation during embryonic life without destroying the life of the embryo ; or, if the severed part were one of the extremities, how there could be a new extremity formed. In such a case, if life continued and birth were to take place, the animal must be born in an imperfect state. In regard to amputations taking place at any time after birth, if the expression "some power of regeneration" means to imply a new formation to take the place of the severed part, the assertion is not correct. What occurs in such cases may be illustrated by the very common accident of the severance of the end of a human finger at the root of the nail. If the incision is far enough back to remove the whole of the vessels which secrete the horny substance that forms the nail, there will be no after-

growth of anything resembling a nail. If some of those vessels are left in the stump, there will be continuous secretion and deposit of the horny substance, which may go so far as to form a crude resemblance to a nail. But if all the vessels which constitute the means of perpetuating a perfect nail are not left in their normal number and action, there can be no such thing as the formation of a new nail. Whether it is correct to speak of the imperfect continuation of a few of the vessels to secrete the substance which it is their normal function to secrete, as a "power of regeneration," is more than doubtful, if by such a power is meant a power to make a new and complete structure to take the place of the structure that has been cut away. It is nothing more than the continued action of a few vessels, less in number than the normal system required for the continued growth and renewal of the part in question. The abortive product in such cases looks like an unsuccessful effort of Nature to make a new structure in place of the old one; but it is not in reality such an effort. The fact that the same thing occurs, in just the same way and to a corresponding extent, in different animals, has no tendency to prove anything excepting that these different animals share the same general system of secreting vessels for the formation and perpetuation of the several parts of their structures. It has no tendency to prove that they are co-descendants from a common ancestral stock, for on the hypothesis of their special and independent creation a common system of secreting vessels would be entirely consistent with their peculiar and special constructions.

CHAPTER IV.

The doctrine of evolution according to Herbert Spencer.

PASSING from Mr. Darwin as the representative of that class of naturalists who have undertaken to assign the pedigree of man by tracing the stages of his development back to the lowest and crudest form of animal life, I now come to a philosopher whose speculations carry the doctrine of evolution through every field of inquiry, and who, finding, as he supposes, evidence of its operation throughout all the other realms of the physical and the moral world, contends that it also obtains in the animal kingdom. It were to be wished that this writer, whose intellect is of the order of minds to which we naturally look for a judicial treatment of such themes, had been a little less dogmatic in his treatment of the doctrine of special creations. Mr. Spencer has, indeed, consistently recognized the necessity of trying the question between the hypothesis of special creations and the hypothesis of evolution, as one to be decided, if it is to be decided at all, only by an examination of evidence. But to one who approaches this question in a spirit of inquiry, and with a desire to learn whatever can be said on both sides, it is somewhat disappointing to find that the most eminent writer of the evolution school is unjust in his treatment of the belief which he opposes. There can be no objection to advocacy, or to strong and decided advocacy, when settled convictions are to be vindicated. But with advocacy we may expect that kind of fairness which

consists in a full recognition of the opposite argument. A great master of dialectics once laid it down as a maxim of advocacy, "State the case of your opponent as strongly as you know how, stronger if possible than he states it himself, and then answer it, if you can." Some instances in which Mr. Spencer has not followed this wise rule may now be mentioned :

1. He attacks with great vigor the hypothesis that living beings resulted from special creations, as a primitive hypothesis ; and because it is a very ancient belief he pronounces it to be probably untrue. He even goes so far as to assert that its antiquity raises a presumption against it. He classes it among a family of beliefs which began in primitive ages, and which have one after another been destroyed by advancing knowledge, until this one is almost the only member of the family that survives among educated people.* He says that if you catechise any one who holds this belief as to the source from which he derived it, he is forced to confess that it was put into his mind in childhood, as one portion of a story which, as a whole, he has long since rejected. It will give way at last, along with all the rest of the family of beliefs which have already been given up. It may be that the arguments of those whose controversial writings on this subject Mr. Spencer had before him, relied on the antiquity of this belief as one of the strongest proofs of its probable truth. I have not looked to see how any writer on that side of the question has used the antiquity of the doctrine of special creations. But it is certainly not in accordance with the sound rule, even of advocacy, to state the argument in support of the belief which you oppose with less than the force that may be given to it, whether your opponents have or have not given to it the true force that belongs to it. The mere antiquity

* "The Principles of Biology," by Herbert Spencer, vol. i, p. 334 *et seq.* I use the American edition, D. Appleton & Co., 1881.

of the belief in special creations has this force and no more : that a belief which began in the primitive ages of mankind, and has survived through all periods of advancing knowledge, must have something to recommend it. It is not one of those things that can be swept away with contempt as a nursery-tale, originating in times of profound ignorance and handed down from generation to generation without inquiry. That it has survived, after the rejection of other beliefs that originated at the same period—survived in minds capable of dealing with the evidence in the light of increasing knowledge—is proof that it has something more to rest upon than the time of its origin. If some of its defenders now assert its antiquity as the sole or the strongest argument in its favor, its opponents should not assume that this is the only or the best argument by which it can be supported. Nor can it be summarily disposed of by classifying it as one of a family of beliefs that originated in times of ignorance, and that have mostly disappeared from the beliefs held by educated people. Its association with a special class of mistaken beliefs affords no intrinsic improbability of its truth. Every belief has come to be regarded as a mistaken or a true one, not according to its associated relations with other beliefs that have come to be regarded as unfounded, but according to the tests that the knowledge of the age has been able to apply to it. Take the whole catalogue of beliefs that began to be held in the darkest ages, and it will be found that their association has had no influence beyond inducing incorrect habits of reasoning on certain subjects, or a habit of accepting the official authority of those who claimed to be the special custodians of truth. These intellectual habits have been temporary in their influence, and have gradually changed. Every one of the beliefs that have been given up by the lettered or the unlettered part of mankind, has been given up because better knowledge of a special character has come

to show that it is unfounded, and because mere official authority has ceased to have the power that it once had. If a belief has survived from a remote antiquity among those who are competent to judge of the evidence in its favor, by comparing the phenomena that increasing knowledge has accumulated, the force of the fact that it has so survived is not weakened by its association for a period with other beliefs that are now rejected.

Mr. Spencer asserts that, as the supposition of special creations is discredited by its origin in a time when men were profoundly ignorant, so conversely the supposition that races of organisms have been gradually evolved is credited by its origin, because it is a belief that has come into existence in the most instructed class, living in these better instructed times. This is a kind of argumentation that is often the result of a love of antithesis. The soundness of the last branch of the proposition appears to depend upon the soundness of the first branch. Make it to appear that the origin of the elder hypothesis is unfavorable by reason of the time of its origin, and it seems to follow that the origin of the modern hypothesis is favorable by reason of its time of origin. But this antithesis does not express the exact truth in either branch of it. It is not because of its antiquity, or of the character of the times in which it was first believed, that the doctrine of special creations can be shown to be irrational or improbable. There is no presumption against the truth of any belief, to be derived from the fact that it was held by persons who also held some erroneous beliefs on other subjects. If there were, nothing could be worthy of belief unless it could show a recent origin, or at least until demonstration of its truth had overcome the presumption against it. On the other hand, there is no presumption in favor of the truth of a new theory to be derived from the fact that it is new, or that it originated among those who think that they do not

hold any erroneous beliefs, or because it originated in a comparatively very enlightened age. Every physical and every moral theory, unless we mean to be governed by mere authority, whether it is ancient or recent, must be judged by its merits, according to the evidence.

2. Another of Mr. Spencer's naked assertions is that the belief in special creations is "not countenanced by a single fact." Not only did no man "ever see a special creation," but "no one ever found indirect proof of any kind that a special creation had taken place." In support of this sweeping dogma, he adduces a habit of the naturalists who maintain special creations to locate them in some region remote from human observation.* This is another instance of not stating the case of your adversary as strongly as you might state it, or as he states it himself. While no naturalist and no other person who believes in special creations ever saw one take place, indirect and circumstantial evidence tending to show that the earth is full of them has been accumulated to an enormous amount. It is a monstrous extravagance to assert that the hypothesis is "absolutely without support of any kind." What if Mr. Spencer's opponents were to retort that no man ever saw an instance in which an animal of a distinct species had been evolved out of one of an entirely different organization; that there is no external evidence to support the hypothesis of such derivations, and that the naturalists of the evolution school habitually place the scene of operations in the region of scientific imagination? The discovery of truth is not likely to be much advanced by this mode of attacking opposite opinions, yet it could be used with as much propriety on the one side of this question as on the other.

3. Next, and completing the misrepresentation, we have the assertion that, "besides being absolutely without evi-

* "Biology," i, p. 336.

dence to give it external support, this hypothesis of special creations can not support itself internally—can not be framed into a coherent thought. . . . Immediately an attempt is made to elaborate the idea into anything like definite shape, it proves to be a pseud-idea, admitting of no definite shape. Is it supposed that a new organism when specially created is created out of nothing? If so, there is a supposed creation of matter, and the creation of matter is inconceivable, implies the establishment of a relation in thought between nothing and something—a relation of which one term is absent—an impossible relation. . . . Those who entertain the proposition that each kind of organism results from divine interposition do so because they refrain from translating words into thoughts. The case is one of those where men do not really believe, but *believe they believe*. For belief, properly so called, implies a mental representation of the thing believed; and no such mental representation is here possible.”*

When I first read this passage I could hardly trust the evidence of my eye-sight. It seemed as if the types must have in some way misrepresented the distinguished writer; for I could scarcely conceive how a man of Mr. Spencer's reputation as a thinker could have deliberately penned and published such a specimen of logic run riot. It reads like some of the propositions propounded by the scholastics of the middle ages. But, having assured myself that the American edition of his work is a correct reprint, and having carefully pondered and endeavored to ascertain his meaning, I was forced to the conclusion that he supposes this to be a conclusive answer to the idea of absolute creation in respect to anything whatever, because, when put into a logical formula, one term of the relation is nothing, and the other term is something. Logical for-

* “Biology,” i, pp. 336, 337.

mulas are not always the best tests of the possibility of an intellectual conception, or of what the mind can represent to itself by thought, although to a certain class of readers or hearers they often appear to be a crushing refutation of the opposite opinion or belief against which they are employed.

Is there in truth anything impossible because it is unthinkable in the idea of absolute creation? Is the creation of matter, for example, inconceivable? It certainly is not if we adopt the postulate of an infinite Creator. That postulate is just as necessary to the evolutionist who maintains the ordination of fixed laws or systems of matter, by the operation of which the organized forms of matter have been evolved, as it is to those who maintain that these forms are special creations. Who made the laws that have been impressed upon matter? Were they made at all, or were they without any origin, self-existing and eternal? If they were made, they were made out of nothing, for nothing preceded them. Then apply to them the logical formula, and say that one term of the relation is absent—is mere nothingness—and so there is an impossible relation, a relation in thought between nothing and something, which is inconceivable. This dilemma is not escaped by asserting, as Mr. Spencer does, that “the creation of force is just as inconceivable as the creation of matter.” It is necessary to inquire what he means by a “conceivable” idea. If he means that we can not trace or understand the process by which either force or matter was created, our inability may be at once conceded. But if he means that, granting the postulate of an infinite creating power, we can not conceive of the possibility that matter and all the forces that reside in it or govern it were called into being by the will of that power, the assertion is not true. Human faculties are entirely equal to the conception of an infinite creating power, whatever may be the strength or the weakness of the proof

by which the existence of such a power is supported ; and if there is such a power it is a contradiction in terms to assert that absolute creation, or the formation of "something" out of "nothing," is an impossible conception. Such an assertion is simply a specious play upon words, or else it involves the negation of an infinite creating power. The term "creation," as used in all modern philosophy, implies, *ex vi termini*, the act of causing to exist ; and, unless we assume that nothing which exists was ever caused to exist, we must suppose that the causing power was alike capable of giving existence to matter and to the forces that reside in it.

The reason why the Greek philosophers did not embrace the idea of absolute creation was not because it was an unthinkable idea, or one incapable of representation in thought. They were, as we have seen, surrounded by a mythology which attributed the origin of the world to polytheistic agencies. They struggled against the cosmogony of poetical and popular traditions in an effort to find a cause of a different character. Monotheism, the conception of the one only and omnipotent God, freed philosophy from the great want which had hampered its speculations. This want was the conception of divine power, as abstracted from substance or the qualities of substance. When this conception had been obtained, absolute creation was seen to be a legitimate deduction from the illimitable scope and nature of the power which monotheism imputed to the Being supposed to preside over the universe, and to have existed before all the objects which the universe contains : and this conception of the act of creation thus became equally capable of representation in words and in thought. You may say that it has no evidence to support it ; that it leads to contradictory ideas of the attributes claimed for the Creator ; that upon the hypothesis of those attributes, his works are inexplicable. Whether you can say this truly or

not, you can not say that absolute creation is inconceivable ; and unless you mean to claim that neither matter nor force was ever created, that there never was a being competent to make either the one or the other to exist, you can not deny the probability that both were called into being by a definite and specific exercise of power. Mr. Spencer's philosophy manifestly leads to the conclusion that there is no God, or no such God as the hypothesis of special creations supposes, or such as the hypothesis of evolution necessarily calls for. If I understand him rightly, he rejects the idea of any creation, whether of matter, or force, or the properties of matter, or even of law of any kind, physical or moral. Hence it is that I admit the necessity of treating the existence of the Omnipotent Creator as an independent question to be judged upon moral evidence ; and hence, too, in reasoning upon the probable methods of the Almighty, I maintain that the postulate of his existence is alike necessary to the evolutionist and to those who believe in special creations, and that both must adopt the same cardinal attributes as attributes of his power and character.

It is well to pursue this particular topic somewhat further, because this special difficulty arising from the creation of something out of nothing, triumphantly propounded by a certain class of philosophers, is echoed by others as if it concluded the question. The received meaning of language is often a great help to the mind in representing to itself in thought the idea that is expressed by the word. The word contains and suggests the thought. Lexicographers are the learned persons, one part of whose business it is to exhibit the thought that is represented by a word, not according to the popular and, perhaps, uncertain or erroneous use of the term, or according to its secondary meanings, but according to the exact correspondence between the word and the idea which it conveys in its primary and philosophic usage. The definition given to our English verb "create," in its

primary and philosophical sense, is: "To produce," "to bring into being from nothing"; "to cause to exist." "Creation," as a noun expressing the act described by the verb, is defined as "the act of creating: the act of causing to exist, and *especially*, the act of bringing this world into existence." "Created," as the past participle which describes what has been done, is defined as "formed from nothing: caused to exist; produced; generated."* This is the sense in which the word is used in the English version of the first verse of the book of Genesis: "In the beginning God *created* the heavens and the earth"; and whatever may be said about the source from which Moses derived his knowledge of the fact which he relates, there can be no doubt about the nature of the fact which he intended to assert. Now, does the lexicographer, when he describes creation as the act of causing something to exist, or the act of producing something out of nothing, present an idea that is incapable of mental representation—a relation impossible in thought? What he means to express is clear enough. Is the idea which he expresses impossible to be conceived by the mind?

It will be a good test of this supposed insuperable difficulty to apply the term "creation" to some human act. When Shakespeare composed the tragedy of "Hamlet," he created something in the sense which we are here considering.† He created that something out of nothing: for he caused something to exist which did not exist before. He did not merely inscribe certain words upon paper, by the material process of writing, and afterward cause the same words to be repeated by the material process of printing

* Webster's "Dictionary of the English Language."

† Let it be remembered that the sense which is here considered comprehends not only material objects, but also ideas, images, and in short whatever, in its kind, had no previous existence. This is just as true of an original poem, or picture, or statue, or musical composition, as it is of a machine that is both original and new as a piece of mechanism.

upon another paper. He gave intellectual existence to certain male and female persons of his imagination, carried them through certain periods of their imaginary lives, and made them and their history an imperishable intellectual idea. It is entirely immaterial to the present discussion that such a product of the imagination presents to us nothing but intellectual ideas ; that Hamlet and Ophelia, and the King and Queen, and all the rest of the *dramatis personæ*, were mere creatures of the poet's fancy. Although they were nothing but intellectual conceptions, they were "creations" in the sense of being intellectual products that never existed in idea before the poet made them, and therefore they were made out of nothing. Now, although we can not look into the mind of Shakespeare and describe the process by which he formed these creatures of his imagination, we experience no difficulty when we contemplate these imaginary personages, in representing in thought what we mean when we say that he "created" them. It would be simple absurdity to say that he did not create these ideal persons, because the notion of creation implies the formation of something out of nothing. That is the very meaning of creation in its primary and philosophical sense ; and, when applied to works of the human imagination, it presents to us an idea that is perfectly capable of representation in thought.

Pass from this illustration of the idea of human creation to the hypothesis of a supreme being, possessing infinite power, and existing before the material universe began. The hypothesis of his existence includes the power to call into being things that had no previous being, whether these things be matter and material properties or moral and intellectual ideas. The whole realms of possible existence, spiritual and material, the whole void which consists in mere nothingness, are, according to the hypothesis, under his absolute sway. He holds the power of absolute creation ; and the power this hypothesis imputes to him is no

more incapable of representation in thought than is the inferior and limited power of creation, which we know to be performed by the finite human intellect, and which we have no difficulty in conceiving as a true creating faculty. When Watt formed the steam-engine, he did something more than to place certain portions of matter in certain relations, and make them to operate in a certain manner so as to produce a certain effect. He made the intellectual plan of a certain arrangement of matter ; and to this act of giving being to something, both intellectual and physical, which did not exist before, we ascribe in its true sense the act of creation, and the idea we express by the term is perfectly capable of mental representation.

“ Those,” says Mr. Spencer, “ who entertain the proposition that each kind of organism results from a divine interposition, do so because they refrain from translating words into thoughts ” ; and he adds, quite truly, that there is no assignable mode or conceivable way in which the making of a new organism can be described. Let this be applied to some new mechanical structure produced by the intellect and hand of man. It is a result or product of human interposition. When we describe this human product as an invention, do we refrain from translating words into thoughts because we can not describe the process of invention ? or, in other words, because we can not assign the mode in which the mind of the inventor reached his conception, are we to conclude that he did not attain to the conception which is plainly embodied in the machine that stands before our eyes ? If we say that he created something, do we make a statement that can not be consistently imagined because we can not assign the mode in which his mind operated when it thought out the idea and constructed the plan ? We can see how he put together certain material substances, and how they operate ; but we can not see or describe the mental process by which he ob-

tained his conception. Yet we ascribe to his act, and rightly ascribe to it, the idea of creation ; and the term represents a thought of the mind that is as capable of being imagined as the word is of being spoken and understood.

When Raphael painted the Sistine Madonna, he formed in his mind an image of the heaven-chosen mother of Christ, and the marvelous skill of his artist hand transferred that face of surpassing loveliness to the canvas. The story that it tells may be a fiction or a fact. The image is a reality. It was a new existence ; and, if we call it a creation, do we use a word which we can not translate into thought because we do not know how the painter attained to that sweet conception of the human mother's tenderness, and the dignity of her appointed office as the handmaiden of the Lord ?

There is nothing unphilosophical in thus ascribing what is done by finite human faculties and what is done by the infinite Creator to a power that is of the same nature, but which in the one being is limited and imperfect, and in the other is superhuman and boundless. If we know, as we certainly do, that weak and finite man can perform some acts of creation, can cause some things to exist that did not previously exist, how much more may we safely conclude that a being of infinite powers can call into existence, out of the primeval nothingness, objects of the most stupendous proportions, of the nicest adaptations, of the most palpable uses—can cause matter and force and law to be where before all was vacuity, where force was unknown, where law had never operated ! When the mind contemplates that Omnipotent Power, it reaches forth to an awful presence ; but it does not contemplate something of which it can not conceive, for its own inferior faculties teach it that creation is a possible occurrence.

We do not need to be and are not indebted to superstition, to tradition, or to deceptive words, for the idea of

creation. At an immeasurable distance from the Almighty Power, we ourselves are constantly creating ; and it is when we do so that our acts resemble his in their nature, however below his productions may be the productions of our poor human faculties. It is one of the proofs of our relationship to the infinite Creator, a proof for which we are not indebted solely to revelation, that we are endowed in this imperfect degree with a power that resembles his. It is also one of the chief of the characteristics that distinguish man from the other animals : for, wonderful as are the constructions made by some of them, they are uniformly made under the involuntary and uncontrollable impulse of an implanted instinct ; whereas, the constructions of man are made by the exercise of a constructive faculty that is guided by his will, which enables him to effect variations of structure entirely unattainable by any other being that exists on this earth. All the other animals are confined in the exercise of their constructive faculties to an invariable model, appointed for each of them according to the circumstances of its being. The range of choice is bounded by the limitations of the instinct under which the animal is compelled to do its work. It may appear to select a favorable site for its habitation, to cull its materials with judgment, to guard against disturbance from the elements or from enemies. But we have not much reason to suppose that any of these things are done from anything but an irresistible impulse, and we certainly have no reason to suppose that the animal has the moral power to do them or to refrain from them. To man alone does there appear to have been given the power of varying his constructions by the exercise of an intelligent will ; and that will is bounded only by the limitations of his power over matter : so that, in respect to material structures, the power of man to make creations approaches nearest to the power of the Almighty Creator, and is, within its limitations, a true creating

power. In the realm of intellectual or ideal creations, the resemblance of human and divine power is the same, and the limitations upon the former are those fixed by the finite nature of human faculties.*

4. Mr. Spencer has a great deal to urge against "the current theology," and he treats of some of the theological difficulties in which those who espouse the hypothesis of special creations entangle themselves.† I have nothing to do with the current theology. I do not borrow from it or rely upon it, and do not undertake to disentangle its professors from any of the difficulties in which they may have involved themselves. The only question that interests me is, whether the objections propounded by this philosopher as an answer to the hypothesis of special creations present insuperable difficulties to one who does not depend upon the current theology for arguments, explanations, or means of judgment. I shall therefore endeavor to state fairly and fully the chief of the supposed difficulties, without considering the answer that is made to them by those who are taken as the representatives of the current theology.

Put into a condensed form, one of Mr. Spencer's grand objections to the belief in special creations of organized

* Perhaps I owe an apology to a large class of readers for having bestowed so much attention upon the logical formula with which Mr. Spencer aims to dispose of the idea of creation. But I have observed, especially among young persons and others whose habits of thinking are unformed or not corrected by sound and comprehensive reasoning, a popular reception of this particular dogma, which makes it necessary to subject it to some careful analysis. In fact, one of my chief objects in writing this book has been to contribute what I might to the formation of habits of testing philosophical and scientific theories by something better than specious assumptions which can be thrown into the plausible form of logical propositions. There is nothing more valuable than logic, when its forms represent a true and correct ratiocination; and, when they do not, there is nothing that is more delusive. It needs some discipline of mind to enable people to see when logic is valuable and when it is not. † "Biology," i, p. 340 *et seq.*

beings is that it involves a deliberate intention on the part of the Creator to produce misery, suffering, pain, and an incalculable amount of evil, or else that there was an inability to prevent these results. Omitting for the present the human race, and confining our first view to the other animals, the earth is largely peopled by creatures which inflict on each other and on themselves a vast amount of suffering. The animals are endowed with countless different pain-inflicting appliances and instincts; the earth has been a scene of warfare among all sentient creatures; and geology informs us that, from the earliest eras which it records, there has been going on this universal carnage. Throughout all past time there has been a perpetual preying of the superior upon the inferior—a ceaseless devouring of the weak by the strong. In almost every species, the number of individuals annually born is such that the majority die of starvation or by violence before arriving at maturity. But this is not all. Not only do the superior animals prey upon the inferior, for which there may be suggested some compensating benefit by the sustentation of a higher order of life through the death of the lower, or by leaving the most perfect members of a species to continue that species, but the inferior prey upon the superior, and organisms that are incapable of feeling have appliances for securing their prosperity at the expense of misery to organisms capable of happiness. Of the animal kingdom, as a whole, more than half, it is said, are parasites, and almost every known animal has its peculiar species. Passing over the evils thus inflicted on animals of inferior dignity and coming to man, we find that he is infested by animal and vegetable parasites of which two or three dozens may be distinctly enumerated; which are endowed with constitutions fitting them to live by absorbing the juices of the human body, furnished with appliances by which they root themselves in the human system, and made pro-

lific in an almost incredible degree. They produce great suffering, sometimes cause insanity, and not infrequently death.*

The dilemma that is supposed to be created by these facts for those who believe in the doctrine of special creations is this : If any animals are special creations, all are so ; and each animal must be supposed to have been created for the special purposes that are apparent upon an examination of its structure and mode of life. As the superior are constantly preying upon the inferior, and as there are numerous inferior animals that are constantly inflicting evil upon the superior, it results that malevolence rather than benevolence was a characteristic attribute of the creating power, or else that the power which is supposed to have created was unable to make the perfect creation which the hypothesis of infinite benevolence calls for. Infinite goodness fails to be demonstrated by a world that is full of misery, caused by special appliances to bring it about ; and infinite power can not have existed, unless it comprehended the power to produce perfect and universal happiness.

I pass entirely aside from the argument which is drawn from the supposed manifestations of Almighty power in the creation of diversified forms of animal and vegetable life, because that argument leads doubtless to the inquiry whether the Almighty made these manifestations to demonstrate his power to himself, or made them to demonstrate it to his human creatures. Admitting the fact, as Mr. Spencer puts it, that millions of these demonstrations took place on earth when there were no intelligent beings to contemplate them—a statement that is said to be verified by the deductions of geology and paleontology—an inquiry into the period or the purpose of these manifestations of divine

* This is given almost *verbatim* from Mr. Spencer's "Biology," i, p. 340 *et seq.*

power as manifestations only, merely leads us into some of the arguments of the current theology. There is another realm of thought and reasoning into which it will be far more profitable to enter. It is that realm which lies outside of tradition and the teachings of theologians, and which takes the hypothesis of infinite power and infinite goodness, not as something which we have been taught to believe, but as a postulate of philosophical reasoning; and, applying this hypothesis to the known facts of the animal and vegetable world, endeavors to ascertain whether these facts necessarily create an insuperable difficulty in the hypothesis which lies at the basis of all sound reasoning on the subject. For I must again insist, and shall endeavor specifically to show, that this hypothesis of infinite power and goodness is equally necessary to the evolutionist and to the believer in special creations, unless all speculation on the genesis of the world is to end in blind chance, and the negation of a personal creating power of any kind.

What, then, is the true philosophical mode of dealing with the existence in the world of physical and moral evil, in reference to the hypothesis of infinite power and infinite goodness? I do not ask what is a perfect demonstration of the problem of physical and moral evil—although I think that the natural solution is very near to demonstration; but the inquiry which I now make is, What is the reasonable mode of comparing the existence of suffering, pain, misery, and their immediate agencies, with the supposition of an all-wise, all-powerful, and perfectly beneficent Creator?*

* In treating of the existence of physical and moral evil, I do not mean to include sin in the discussion. I mean now by moral evil that loss or diminution of happiness, for the individual or a race, which results from physical evil produced by causes for which the sufferer is not responsible. The sin that is in the world is a matter that is to be considered entirely with reference to the accountability of man as a moral being; and the

What we have to do, in the first place, is to contemplate the scope of infinite goodness ; or, in other words, to consider that infinite benevolence is, in its very nature, guided by unerring wisdom, and consequently that its methods, its plans, and its results are as far beyond the methods, plans, and results which our imperfect benevolence would adopt or achieve, as infinite power is beyond our finite and imperfect capacity. This does not call upon us to conceive of something that is inconceivable, or that can not be represented in thought ; for power and goodness are qualities that we know to exist : we know that they exist in degrees ; and that what exists in a measurable and limited degree may exist without measurable limitation, or in absolute perfection. The philosophic mode of regarding perfect goodness requires us to consider its methods and results with reference to its perfect character, and not to measure them by the inferior standards of human wisdom. Following out this obvious truth, we have next to inquire whether the physical and moral evil which we see ought to destroy the very idea of an infinitely benevolent Creator, and to compel us to regard him as a malevolent being, or else to destroy our belief in his infinite power, because his power has been unable to make a world of perfect happiness and enjoyment for his creatures. If this dilemma seriously exists, it is just as great a difficulty for the hypothesis of evolution as it is for that of special creations, and it drives both schools into the utter negation of any intelligent causing power adequate to produce what we see.

In the next place, let us see what is the sum total of the physical and moral evil in the animal kingdom, which, in reference to the sum total of happiness, is supposed to

reasons which may be assigned for its permission may be quite distinct from those which relate to the existence of physical suffering for which man is not responsible upon any rational theory of moral accountability.

create this formidable impeachment of the Almighty benevolence on the one hand, or of the Almighty power on the other. As to the order of things which permits the superior animals to prey upon the inferior, there is an explanation which lies on the surface of the facts, and which would seem to satisfy all the requirements of philosophic reasoning, whatever may be the mode in which this part of the moral problem is dealt with by theologians. We find the fact to be that, as we rise higher and higher in the scale of organized beings, the superior are capable of happiness in a greater degree than the inferior, in some proportion to the superiority of their organization. The comparative duration of life among the different animals also enters into the estimate of the sum total of happiness. As a general rule, the inferior organizations are individually more short-lived than the superior. Now, it might have pleased the Creator to cause all animals to be fed by manna from heaven, or to find their sustenance only in vegetable products; and he could thus have dispensed with the carnivorous appetite, and have rendered it unnecessary for the superior to prey upon and destroy the inferior. But, although he could thus have made a world from which the misery of this perpetual carnage would have been absent, and which would have been so far a world of perfect happiness, the fact is that this law of universal destruction is so shaped as to follow the increasing capacity for happiness and enjoyment which moves through the ascending scale of the organized beings. It also follows another obvious purpose of the carnivorous appetite and of the permission to indulge it. A large part of the whole animal kingdom is so constructed that sustentation requires animal food. The blood, the tissues, the whole substance of some animal structures require to be renewed by similar substances; and although life may sometimes be continued by the assimilation of vegetable substances alone, it is not

the life for which the animal was formed, because it is not always the life which makes the full end of its being, and realizes its best capacity for enjoyment and for the continuation of its species. In some cases, the carnivorous appetite is withheld. The animal lives and thrives best upon a vegetable diet, and so far as the flesh of these animals enters into the wholesome and beneficial food of man, the animal fulfills one purpose of its existence. Some animals, before they become fit food for man, have been nourished by the substance of still other animals. In all this variety of modes in which animal food is prepared for man, and in the whole of the stupendous economy by which the superior organizations prey upon the inferior in order that each species may continue itself and may fulfill the purposes of its existence, we may without any difficulty trace an obvious reason for the permission that has been given to such destruction of individual life. When to the sum total of happiness and benefit which this permission bestows on each of the orders of the inferior animals according to its capacity for enjoyment, whether it does or does not enter into the food of man, whether it comes or never comes within the reach of his arm, we add the sum total of happiness and benefit which this law of universal destruction bestows on man, so far as he avails himself of it, we shall find no reason to impeach the Divine Goodness or to adopt a conclusion derogatory to the Infinite Power. We may dismiss the difficulty that is supposed to arise from the warfare of the superior upon the inferior beings, because that warfare, when we trace it through all its stages, involves no sort of deduction from the perfect character of the Divine Goodness or the Divine Power.

Next, we come to the liability of animals, man included, to be preyed upon by parasites, creatures of a very inferior order when compared to the animals which they infest. I have looked in vain through Mr. Spencer's speculations for

any explanation which makes the existence of the parasitic animals a support to the theory of evolution without involving the same impeachment of the Divine Power or the Divine Goodness which is supposed to be involved in the hypothesis of special creations. We are indeed told that evolution brings about an increasing amount of happiness, all evils being but incidental ; that, applying alike to the lowest and to the highest forms of organization, there is in all cases a progressive adaptation, and a survival of the fittest. "If," it is argued, "in the uniform working of the process, there are evolved organisms of low types, which prey on those of higher types, the evils inflicted form but a deduction from the average benefits. The universal and necessary tendency toward supremacy and multiplication of the best, applying to the organic creation as a whole as well as to each species, is ever diminishing the damage done, tends ever to maintain those most superior organizations which, in one way or another, escape the invasions of the inferior, and so tends to produce a type less liable to the invasions of the inferior. Thus the evils accompanying evolution are ever being self-eliminated." *

Admitting, for the argument's sake, that this is true, how does the hypothesis of evolution meet the difficulty ? The parasitic inferior organizations exist, and they have existed, more or less, as long as we have known anything of the superior organizations on which they prey. They have inflicted and still inflict an incalculable amount of evil, an untold diminution of the happiness that might have been enjoyed if they had never existed. The mode in which they came into existence, whether by the process of evolution or by special creations of their respective forms, does not affect the amount of evil which their ravages have produced and are still producing. If they exist under an

* "Biology," i, p. 354.

order of things which has made them the products of an evolving process that has formed them out of still lower types, while they exist they have the same power of inflicting evil as if they had been specially made in their respective types without the former existence of any other type. If they owe their existence to the process of evolution, they exist under a system that was designed to lead to their production by the operation of uniform laws working out a uniform process ; and under this process, so long as they are produced by it, they imply gratuitous malevolence, just as truly as they do if they are supposed to have been specially created. The evils which they have inflicted and still inflict were deliberately inflicted, unless we suppose that the hypothetical process of evolution was not a system ordained by any supreme and superhuman power, but was a result of blind chance ; that the system was not created, but, without the volition of any power whatever, grew out of nothing.

The compensating tendency of the evolution system to evolve superior organisms, which in one way or other "will escape the parasitic invasions," by becoming less liable to them, and so to diminish the damage done, as a sum total, finds a corresponding result in the system of special creations by a different process and at a more rapid rate. For the hypothesis of special creations, rightly regarded, does not assume the special creation of each individual animal as a miraculous or semi-miraculous interposition of divine power ; and even when we apply it to the lowest types of animals it implies only the formation of that type with the power in most cases of continuing its species. Assuming the parasitic animals to be in this sense special creations, the superior organisms on which they prey during their existence may become less liable to their invasions by an infinity of causes which will diminish and finally put an end to the parasitic ravages. In the progress of medical science man may be wholly relieved from the worst and most

obscure parasites that have ever infested him, without waiting for their evolution into some other type of animal that does not desire or need to prey upon the human system, or without waiting to have the human organism developed into one that will not be exposed to such causes of suffering or death. We know already that very simple precautions will ward off from man some of the most subtle of these enemies ; and even in the case of animals lower than man we know that instinct teaches them how to avoid the ravages of some of the parasites to which they are exposed, even if there are others which they can not now escape.

So that, viewing as a whole the amount of misery inflicted by the inferior organisms upon the superior, and looking from the first forward to the last "syllable of recorded time," we are able upon either of the two hypotheses respecting the origin of animals to reach certain definite conclusions, which may be stated as follows : This world was not intended to be a state of unmixed and unbroken individual happiness for any of the animal organisms. Death for every individual in some form was necessary to the carrying on and the carrying out of the scheme of average enjoyment and the accomplishment of a sum total of benefit that becomes larger and larger as time goes on ; and, although death without suffering might have been ordained, the moral purpose for which suffering was allowed to precede death required that it should be permitted in numberless cases and forms, and by almost numberless agencies, although not always made necessary. This great purpose can be discerned without taking into view at all the idea of a future state of existence for man or any of the other terrestrial beings, and looking only at the moral development of man individually and collectively as an agent in the promotion of happiness on this earth. Man, however he originated, stands at the head of the whole animal kingdom. If for himself and for all the inferior animal organisms

death without suffering had been ordained as the universal rule, he would have been without the full strength of the moral stimulus which now leads him to relieve, to palliate, to diminish, and, as far as possible, to terminate every kind of suffering for himself and the superior organisms that are below him in the scale, which are the most capable of enjoyment and happiness, next after himself, in their various proportionate capacities. He would have had no strong motive for exterminating the inferior and noxious organisms excepting for his own individual and immediate benefit ; no reason for extending the protection of his scientific acquirements to the lower animals excepting to promote his own immediate advantage. Human society would have been without that approach to moral perfection which is indicated by a tenderness for life in all its forms, where its destruction is not needed by some controlling necessity or expediency, and by the alleviation of suffering in all its forms for the sake of increasing the sum total of possible happiness. Human life itself would have been less sacred in human estimation if there had been no suffering to draw forth our sympathies and to stimulate us to the utmost contention against its evils. Civilization would have been destitute of that which is now its highest and noblest attribute. Wars would have been more frequent among the most advanced portions of the human race ; pestilence would not have been encountered with half the vigor or the skill which now wage battle against it ; poverty would have been left to take care of itself, or would have been alleviated from only the lowest and most selfish motives, which would have left half its evils to be aggravated by neglect. As the world has been constituted, and as we have the strongest reason to believe it will continue to the end, there is to be added to the immeasurable sum of mere animal enjoyment of life that other immeasurable sum of moral happiness which man derives from doing good and from the cultiva-

tion of his power to do it—an acquisition and accumulation of benefit which would have been wanting if there had been no physical suffering to awaken pity and to prompt our exertions for its relief.

So that the objection that the hypothesis of infinite goodness required a world where physical pain would have been unknown to any of its organisms, where human sorrow would never have been felt, where human tears would have never flowed, and where death would have been always and only euthanasia, is by no manner of means a necessary conclusion, as the existence of suffering is no impeachment of the Infinite Power. If we consider man only in the light of his rank at the head of all the terrestrial beings, and as therefore capable of the greatest amount of benefit, to himself and to the other creatures, and if we regard him individually as nothing more than a being dwelling on this earth for a short-lived existence and endowed with the power of perpetuating his species, he would have been morally an inferior being to what he is now capable of becoming, and human society would have been far below what it can be made and what we know that to a large degree it already is, if physical suffering had been excluded from the world. All this can be discerned without the aid of revelation; it can be seen by the eye of philosophic reason alone; and it is all equally true upon any hypothesis of the physical origin of man or any other living creature on this earth, unless we suppose that the whole animal kingdom came into being without any intentional design, without any plan of intentional benefit, without any purpose, and without the conscious exertion of any power of any kind.

And, if the question is asked, What is to be the end of this world? or if we go forward in imagination toward the probable end of all this animal life, I can not see that the hypothesis of evolution has more to recommend it than the

hypothesis of special creations in reference to the perfectibility of the world, or to the sum of approximate perfection that seems to be attainable. As, upon either of the two hypotheses, a perfect world does not even now seem to have demanded an absence of suffering, since suffering tends obviously to produce greater benefit than could have followed from its absence, so, in the remotest conceivable future, a nearer and nearer approximation to a state of universal happiness will continue to be worked out by physical and moral causes, which will be as potent under the system of special creations as they can be supposed to be under the system of evolution. It is true that the moral causes will supplement and aid the physical under either of the two systems. But one difficulty with the evolution theory as the sole method by which the past or present inhabitants of the world have come into existence is that, so far as we can judge, it has done and completed its work just as effectually and finally as special creation appears to have terminated in certain forms, some of which are extinct and some of which are living. Take the Darwinian pedigree of man, as stated in a former chapter, or any other mode of tracing the supposed stages of animal evolution. The process has hypothetically culminated in man. At whatever species in the ascending scale you pause, you find that the particular type of animal has either become extinct or that it has continued and still continues to be produced in that same type, with only such variations and incidental differences as have resulted from changed conditions of life, and from the intermingling of different breeds of the same animal. I do not now speak of the theory, which admits, of course, of the hypothetical development of every known animal, past or present, out of its supposed predecessors. But I speak of the facts as yet revealed by the researches of naturalists among all the extinct and living forms of animal life. If there had ever been discovered any one instance in which

it could be claimed by satisfactory proof that an animal of a distinct species had been evolved out of races of animals of a fundamentally different organization, and without the special interposition of any creating power operating to make a new organism, we should certainly have it cited and relied upon as a fact of the utmost importance. I do not say that it would be reasonable to expect direct and ocular demonstration of such a product, any more than it would be reasonable to expect direct and ocular demonstration of an act of special creation. But I say that it could be shown by proofs that ought to be satisfactory if there were any evidence from which the inference that such a fact ever occurred could be reasonably drawn ; just as it is possible to draw the inference of special creation by reasonable deduction from the evidence that tends to establish it as a safe conclusion. But if there has ever been such an instance of the evolution of any known species of animal out of other species shown by satisfactory proof, or if we assume such an occurrence in the past as the theory calls for, what reason have we to suppose that the process of evolution is still going on, and to expect it to go on to the end of time ? We must judge of the future by the past, for we have no other means of judging it. The past and the present both show, so far as we can yet perceive by the facts, that each distinct and peculiar type of animal life remains a perfect and completed production, however it was fashioned or grew into that type ; and that, so far as we have any means of actual knowledge, no crosses of different races of that animal produce anything but incidental variations of structure and mode of life. It is a mere hypothesis that they produce distinct species.

Apply this to the most important of the supposed connections between different animals according to the theory of evolution—that between man and the monkey. The theory calls for the intermediate link or links. Nothing

can be yet found that shows the pedigree without eking it out by general reasoning, and by assumptions that are more or less imaginary. But suppose that the chain of proof were complete, what would it show? It would show that the process of evolution has culminated in man, as its crown and summit, and has there stopped. For, whatever may have been the length of time required for the production of this result, we know what the product is. We have the history of man as an animal for a period of time that has been quite long enough to show that, after he had become in his essential structure as an animal what we know him to be, no subsequent intermingling of the races or families into which the species became divided has produced any change in his essential structure, or any new organs or any differences but differences in the development of powers which are to be found in him at all the stages of his known existence as parts of his characteristic animal structure. The period of his known existence is certainly infinitely small when compared with the whole indefinite future. It is long enough, however, to afford some basis of reasoning about the future; and, short as it is, it tends very strongly to show that the further development of man on earth is to be chiefly a moral and intellectual development; that in physical structure he is a completed type; and that whatever superiorities of mere animal life he may attain to hereafter are to be such improvements as can be worked out, within the limits of his animal constitution, by the science which his accumulating experience and knowledge will enable him to apply to the physical and moral well-being of his race.

To return now to the line of thought from which these suggestions have diverged. If, as we have every reason to believe upon either hypothesis of man's origin, he is a completed animal, standing by original creation or by the effect of the evolution process at the head of the whole animal

kingdom in the apparent purpose of his existence, his agency and his power in promoting the sum of happiness on earth, for himself and all the other animals, are the same upon either hypothesis of his origin. The hypothesis of his origin by evolution gives him no greater power over his own happiness or that of the other creatures than he has if we suppose him to have been specially created ; and it is only by adopting the belief that in his own constitution he is to be hereafter developed into a being incapable of suffering, or one vastly less capable of suffering than the animal called man now is, that the theory of evolution, even in regard to the sum total of happiness on earth, has any advantage over the theory of special creations. If we suppose the future gradual development of a terrestrial being standing still higher in the animal scale than man now stands, exempt from the suffering which man now suffers, we have a great amount of suffering hereafter eliminated from the world by a certain process. But how does this better satisfy the idea of infinite goodness in the power that devised the process, than the hypothesis of special creation which has formed man as an ultimate product of the divine benevolence and power acting together, endowed him with the faculty of eliminating pain and evil from the circumstances of his existence, by his own exertions, and furnished him with the strongest motives as well as with almost immeasurable means for diminishing the amount of evil for himself and all the other beings within his reach ?

5. Another of the specific objections urged by Mr. Spencer against the doctrine of special creations is so put that it is manifestly directed against one of the positions assumed by the representatives of the current theology. The learned philosopher begins this part of his argument by imputing to those who assert this doctrine as their reason for maintaining it, that it "honors the Unknown Cause of

things," and that they think any other doctrine amounts to an exclusion of divine power from the world. To encounter this supposed reason for maintaining the doctrine of special creations, he proceeds to ask whether the divine power "would not have been still better demonstrated by the separate creation of each individual than it is by the separate creation of each species? Why should there exist this process of natural generation? Why should not omnipotence have been proved by the supernatural production of plants and animals everywhere throughout the world from hour to hour? Is it replied that the Creator was able to make individuals arise from one another in natural selection, but not to make species thus arise? This is to assign a limit to power instead of magnifying it. Is it replied that the occasional miraculous origination of a species was practicable, but that the perpetual miraculous origination of countless individuals was impracticable? This also is a derogation. Either it was possible or not possible to create species and individuals after the same general methods. To say that it was not possible is suicidal in those who use this argument; and, if it was possible, it is required to say what end is served by the special creation of species that would not be better served by the special creation of individuals?"* I must again disclaim any participation in the views of those who contemplate this question with reference to the manifestations of divine power by one method of its supposed action or another, or who are influenced by the idea of honoring or dishonoring the Creator. This is not a question of the mode in which the Creator has chosen to manifest his power for the purpose of making it more impressive in the eyes of his intelligent human creatures or more palpable to their perceptions. Nor is it a question, excepting for the theologian who begins to reason

* "Biology," i, p. 339.

upon it from a peculiar point of view, by what belief we best honor the Creator, or the power which Mr. Spencer describes as the "Unknown Cause." In the eye of philosophic reason, apart from all the religious dogmas that have been taught by human interpretations of revelation, this is a question of the probable mode in which the assumed omnipotent power has acted; and it is not a question of how we can best honor or magnify that power by believing that it has acted in one mode and not in another. We have to take, first, the postulate of an infinitely powerful Creator, whose existence is an independent inquiry, which we are to make out upon evidence that satisfies the mind. The hypothesis of his existence and attributes includes the power to create species and to establish the process of natural generation for the continuation of each species, or the power to make separate creations of each individual, as Mr. Spencer phrases it, "from hour to hour." In either mode of action, the power was the same. It is no derogation from it to suppose that the one or the other mode was adopted. It is no augmentation of it to suppose that the one was adopted instead of the other. It is simply a question of what does the evidence show, to the reasonable satisfaction of the human mind, to have been most probably the method that was chosen by a power that could adopt any method whatever. If we find that the creation of species and the establishment of the process of natural generation for the multiplication of individuals is upon the whole sustained by a predominating weight of evidence, it is safe to adopt the belief that this hypothesis of the Almighty method is in accordance with the facts. If the evidence fails to show that species have arisen from each other in the same way that individuals have arisen from each other in natural succession, we have no reason to conclude that such has been the fact. On the other hand, if the evidence shows, by reasonably satisfactory proofs, that a

process has been established for the evolution of distinct species out of other and different species, similar to the process by which individuals arise from each other by natural generation, it will be safe to conclude that such has been the fact. Upon either hypothesis, the power of the Creator remains the same.

Nor is it in any degree necessary to consider in what sense the one method of action or the other was "miraculous," or that the one was an occasional and the other a perpetual exercise of power. The special creations of individuals from hour to hour would be just as miraculous as the special creation of species, and it would be occasional, although the occasions would be indefinite in number. The special creation of species would be just as miraculous as the special creation of individuals, but the occasional exercise of such a power would be limited by the number of species, each of which would be a finality in itself. The dilemma that is suggested by Mr. Spencer is a dilemma only for those who think it necessary to mingle the idea of honoring or dishonoring the Creator by one or another mode of interpreting his works, with a question of his probable method of action. His method of action is to be judged upon the evidence which a study of his works discloses.

6. Mr. Spencer, in summing up his objections to the doctrine of special creations, has said that it not only "fails to satisfy men's intellectual need of an interpretation," but that it also "fails to satisfy their moral sentiment"; that "their moral sentiment is much better satisfied by the doctrine of evolution, since that doctrine raises no contradictory implications respecting the Unknown Cause, such as are raised by the antagonist doctrine." * I have already suggested what seems to me a sufficient answer to the supposed

* "Biology," i, pp. 344, 355.

contradictory implications respecting the goodness and power of the Almighty Creator. But it is here worthy of the further inquiry, What has been the influence upon the sacredness of human life, in human estimation, of a belief in any other theory of man's origin, or of no belief on the subject, compared with the effect of a belief in the doctrine that he is a creature of an Almighty Creator, formed by an exercise of infinite power for the enjoyment of greater happiness on earth than any other creature, and therefore having a peculiarly sacred individual right to the life that has been given to him? This, to be sure, does not afford a direct test of the probable truth of the hypothesis respecting his origin. But the answer to this inquiry will afford some test of the claim upon our consideration that may be put forward for any other hypothesis than the one that embraces the full idea of man's special creation, even if we do not look beyond this world. Compare, then, the civilization of the Romans at the period when it was at its highest development (the age of Julius and Augustus Cæsar), when in many respects it was a splendid civilization. Neither among the vulgar, nor among the most cultivated; not among the most accomplished of the statesmen or philosophers, was there any such belief as the simple belief in the relation between Creator and creature, such as had been held by a people who were regarded by the Romans as barbarians, in respect to man and all the other animals; or such a belief as is now held by the least educated peasant of modern Europe. One consequence of the absence of this belief, or of the want of a vivid perception of it, was that the highest persons in the Roman state, men possessed of all the culture and refinement of their age, not only furnished for the popular amusement combats of wild beasts of the most ferocious natures, but they provided gladiatorial shows in which human beings, trained for the purpose, were by each other "butchered to make a Roman holiday." The

statesmen who thus catered to the popular tastes, and never thought of correcting them, subjected themselves to enormous expenses for the purpose ; and all that was noble and dignified and cultured of both sexes, as well as the rabble, looked on with delight at the horrid spectacle. But this was not all. The Roman law, in many ways a code of admirable ethics, in utter disregard of the natural rights of men, left the life of the slave within the absolute power of the master, without any mitigation of the existing law of nations which made slaves of the captive in war and his posterity. Compare all this with the civilization of any modern country in which the life or liberty of man can be taken away only by judicial process and public authority, for actual crime ; in which institutions exist for the relief of human suffering and for the prevention of cruelty to the inferior creatures ; and then say whether the belief in special creations is not a doctrine that has worked vast good in the world, and one that should not be scouted because it is a "primitive belief."

Again, compare the ages in modern Europe when statesmen and politicians of the highest standing with entire impunity employed assassination for political ends, with periods in the same countries when assassination had come to be regarded not only with abhorrence, but as incapable of justification for any end whatever, public or private, and then say whether the world can lose its belief that man is a special creation of God, without losing one of the strongest safeguards of human life that can be derived from any belief on the subject. All these, and a great many similar considerations, while they do not prove the hypothesis of special creation, show strongly that, unlike some of the family of beliefs with which it was associated in the darkest ages, this one has worked no mischiefs ; that, on the contrary, it has been producing moral, social, and political benefits in all the ages in which it has been most vividly

present to the popular faith. The command, "Thou shalt do no murder," from whatever source it came, whether it was delivered to Moses on the mount of fire, or came from the teachings of Nature and the dictates of social expediency, whether it is a divine or a human law, or both, has unhappily been broken in all times, in all lands, and in all conditions of civilization. It is broken still. But it has never yet ceased, for its moral foundation and for the moral sanction of all the methods which have aimed to enforce it, to rest on the belief that man is peculiarly the child of God, whose life is sacred beyond the life of all other creatures. Whether any other belief of man's origin will afford an equally good foundation for that law, is a question which modern scientific speculation may or may not be able to answer. If its speculations conduct to the conclusion that the "unknown cause" has not specially caused anything, has not established any relation of Creator and creature, that is sufficiently special to imply divine care for the creature, we know what the answer must be. The theologian is not the only person who has occasion to examine the doctrine of evolution; it must be examined by the statesman as well.

CHAPTER V.

The doctrine of evolution according to Herbert Spencer further considered.

IN the last preceding chapter, I have examined Mr. Spencer's chief objection to the doctrine of special creations when considered in its general aspects. I now advance to the general aspects of the evolution hypothesis as applied by this philosopher to the animal kingdom. I have already suggested the appropriate answer to the claim that the derivation of the evolution hypothesis is favorable because it has originated "among the most instructed class and in these better-instructed times," and that the derivation of the other hypothesis is unfavorable because "it originated in times of profound ignorance." On this point it is unnecessary to say more. But there is a supposed "kindred antithesis" between "the two families of beliefs" to which these two hypotheses are said respectively to belong; one of which families "has been dying out," while the other family "has been multiplying." This brings into view the peculiar philosophical system of Mr. Spencer, by which he maintains "the unity of Nature," or the prevalence of a universal law of evolution, as the law which is to be discerned in remote fields of inquiry, and which "will presently be recognized as the law of the phenomena which we are here considering," namely, the phenomena of animal life. "The discovery that evolution has gone on, and is going on, in so many departments of Nature, becomes a reason

for believing that there is no department of Nature in which it does not go on." *

In considering this mode of generalization it is important to distinguish between the phenomena that are observable in those departments of Nature which include only dead or inanimate matter, and the phenomena that are peculiar to matter organized into living beings. Again : it is important to distinguish between phenomena which have been influenced by human agencies and those which can not have been affected by the power of man. Another distinction of the greatest consequence is that which divides the phenomena in question according to their relation to a moral purpose. In one class of phenomena, a moral purpose may be plainly discovered as the purpose of an intelligent causing power, which has chosen a particular means for the accomplishment of an end. In another class of phenomena, a moral purpose may not be discoverable as the end for which the existing arrangement of things was specially designed, and to which that arrangement was an indispensable means. By classifying the departments of Nature and observing their phenomena with these discriminations, we shall be able to judge of the value of Mr. Spencer's philosophical system when applied to the animal kingdom.

In grouping the departments and their respective phenomena as departments in which the law of evolution has obtained, and in drawing from them the sweeping deduction that there is no department in which this law has not obtained as the *causa causans*, Mr. Spencer does not appear to have made these necessary discriminations. He specifies the following remote fields of inquiry, in which he maintains that this law of evolution is now admitted to be the solution of the phenomena that lie in those respective fields :

* "Biology," i, pp. 346-348 *et seq.*

First, the solar system, which, as he asserts, astronomers now consider has been gradually evolved out of diffused matter.* Second, geological discoveries, which show that the earth has reached its present varied structure through a process of evolution. Third, society, which has progressed through a corresponding process of gradual development. "Constitutions are not made, but grow," is said to be now a recognized truth among "philosophical politicians," and a part of the more general truth that "societies are not made, but grow." Fourth, languages, which, we are told, are now believed not to have been artificially or supernaturally formed, but to have been developed. Finally, the histories of religions, philosophy, science, the fine arts, and the industrial arts, show, it is said, development "through as unobtrusive changes as those which the mind of a child passes on its way to maturity." †

It is obvious that in some of these departments neither human agency nor the human will and choice can have had any influence in producing the phenomena, while in some of them human agency, will, and choice have had a vast influence in making the phenomena what they are. That political constitutions or social institutions are not made, but grow, is a dogma that is by no means universally true, however wise it may sound, or with whatever confidence in a paradox it may be asserted by "some political philosophers." While past events and present exigencies may have largely shaped some political constitutions, we know that others have been deliberately modified by a choice that has had more or less of a free scope, and that sometimes this has amounted to an arbitrary decision. Languages may or may not have been a direct and supernatural gift from Heaven, but we know that their structure has been powerfully

* Concerning the nebular hypothesis, and what astronomers now consider, see *post*.

† "Biology," i.

influenced by human agencies, when they have come to be written expressions of thought ; for they have then received expansion by the actual coinage of new words, as well as by new meanings of old words ; and even when they were in the first stages of a spoken tongue, inflections that were purely arbitrary have been introduced. So it has been with systems of religion, philosophy, the fine arts, the mechanic arts, legislation, and jurisprudence. While in all these departments changes have been going on, which upon a superficial view appear to indicate a kind of spontaneous development, when they are analyzed they are seen to have been wholly caused, or more or less influenced, by the genius, the thought, the discoveries, the exertions, and the acts of particular individuals who have had the force to impress themselves upon the age, and thus to make new systems, new beliefs, new products, new rules of social or political life, new tastes, and new habits of thinking and acting.

Again : in some of the various orders of phenomena which are found in these different departments, there is discernible a distinct moral purpose in the shape which they have been made to assume, and in others of them there is no moral purpose discoverable, which we can say required the employment of the particular means to effect the end. Thus, astronomers can not assign a moral purpose for which the distribution of the fixed stars was made to be what it is, and which purpose could not have been answered by some other arrangement. At the same time, it is easy to see that the solar system was arranged with reference to the law of universal gravitation, which made this arrangement of the different bodies essential to the harmonious working of a great and complex piece of mechanism. The present formation of the earth may have resulted just as geologists think it has, and yet they can not say that there was no moral purpose in the division of the exterior surface of our globe into land and water, seas, continents,

mountains, etc. These are departments of Nature in which man has had no influence in producing the phenomena. When we turn to those departments in which man is placed as an actor, we often find an adjustment of means to an end that is so comprehensive, as well as so plain, that we may justly conclude it to have been chosen by the creating power, with the express intent that human agency should be the means by which certain effects are to be produced. For example : man is eminently a social animal. Human society is a result of his strong social propensities. He is placed in it as an actor ; and in this arrangement there is discoverable a moral purpose so plain that we may rightfully regard the social phenomena of mutual protection and improvement as proofs that society was ordained as the sphere of man's highest development on earth.

So that, in reasoning about the phenomena of any of the departments of Nature as affording indications of the so-called universal law of evolution, we must not forget the distinction between organized inanimate and organized animated matter ; or the distinction between those departments in which human will or choice, or the human intellect, has had no influence in shaping the phenomena, and those in which they have had great influence ; or the distinction between phenomena in which a special moral purpose can be and those in which it can not be discovered, as the reason for the existing order of things. It is especially hazardous to argue that because a spontaneous development, or a gradual evolution, can be traced in some of the phenomena of inanimate matter, it therefore must obtain in the animal kingdom. It is alike hazardous to argue, because there has been what is called evolution in some departments of Nature over which man has had no control, that the same law obtains in other departments over which he has also had no control, or those in which he has had a large control.

The bearing of these discriminations upon the supposed universality of the law of evolution may now be seen if we attend to the further inquiry whether that law obtains throughout all the phenomena of any one department of Nature as the sole cause of the phenomena in that department. Take again, for example, the solar system. Suppose it to be true that the bodies which compose it, the sun and the planetary spheres, were gradually evolved out of diffused matter. Does it necessarily follow that their existing arrangements and mutual relations were not specially designed? That their orbits, their revolutions, their distances from each other, were not specially planned? That they were not hung in their respective positions with an intentional adjustment to the great force of gravitation that was prevailing throughout the universe? Must we suppose that all this part of the whole phenomena of the solar system resulted from the operation of an ungoverned evolution, because the bodies themselves may have been gradually formed out of diffused matter into their present condition without being spoken at once into that condition by the fiat of the Almighty? We can certainly see that the existing arrangements must have been intentional; and, if intentional, the intention must have taken effect in the production of the phenomena exhibited by the arrangement, as any design takes effect in the production of the phenomena which are open to our observation. The moral purpose evinced by one part of this arrangement, the alternation of day and night upon the earth, for example, might have been effected by some other means than the means which now produce it. But there is the strongest evidence that a certain means was chosen and intentionally put into operation; and although we can not tell why that means was preferred, the fact that it was both designed and preferred makes it a special creation. To suppose that it was left to be worked out by a process such as the hypothesis

of evolution assumes, by the gradual, fortuitous, and un-governed operation of infinitely slow-moving causes, which might have made the adjustments very different from what they are, is to deprive it of the element of intentional preference that is proved by its existence. The hypothesis of evolution, when applied to all the phenomena of the solar system, relegates one great branch of those phenomena to a realm from which all special purposes and all direct design are absent, and confines the explanation of the phenomena to the operation of causes that might have brought about very different arrangements. That this supposed process of evolution has, in fact, been followed by the existing arrangements of the solar system, does not prove, or tend to prove, that the existing arrangements are solely due to the supposed method of their production; for we can not leave out the element of some design, and if there was a design, the very nature of the system required that the design should be executed by a special creation of a plan for the mutual relations of the bodies composing it. The bodies themselves might have been gradually formed out of diffused matter, floating loosely in the realms of space. The relations of the bodies to each other required the act of an intelligent will, in the direct formation of an intentional plan; and that act was an act of special creation in the same sense in which the structural plan of a species of animal was a special creation.

Here, then, is one department of Nature in which it is not necessary and not philosophical to assume that the law of so-called evolution has been the universal law to which all the phenomena of that department are to be attributed. If we follow out the same inquiry in other departments of Nature remote from the animal kingdom, we shall find reason to adopt the same conclusion in respect to their phenomena. Thus, let us for a moment contemplate another of the departments in which inanimate matter is the

subject of observation, and in which human will or intelligence has had no agency in producing the phenomena, namely, the formation of the present structure of the earth as it is described by geologists. This is a department in which the hypothesis of evolution finds perhaps its stronghold. Yet it is necessary even here to recognize an intentional plan and direct design in some part of the phenomena. Let us suppose that during the period required by any of the speculations of geologists, however long, a mass of matter was gathered in an unformed condition, and gradually shaped into the present condition of the earth by the action of its constituent elements upon each other, influenced by the laws of mechanical forces, of chemical combinations, of light and heat, and of whatever physical agencies were made to operate in the process of evolving the mass into the condition in which it has been known to us for a certain time. Is it a rational conclusion that the intelligent power which put these forces in operation—an hypothesis with which we must begin to reason, or leave the origin of both matter and forces to blind chance—did not guide their operation at all to the intentional production of the results which we see? The results disclose some manifest purposes; and although these purposes, or others equally beneficent, might have been accomplished by different arrangements, we can see that they have been effected by a certain arrangement of a specific character. The results have been continents, seas, mountains, rivers, lakes, formation and distribution of minerals, growth of forests, and an almost innumerable, and certainly a very varied, catalogue of phenomena, physical formations, and adaptations. All these varied results disclose a plan by which this earth became a marvelously convenient abode for the living creatures that have inhabited or still inhabit it, especially for man. The formation of this plan was an intelligent act, if we suppose that

any intelligent being projected the original gathering of the crude primordial matter and subjected it to the operation of the forces employed to shape it into its present condition. This plan was an act of special creation, in the same sense in which the plan of a particular animal organism may have been a special creation. While, therefore, a process which may be called evolution may have operated as the agency through which the earth has reached its present physical condition, the plan of that condition was certainly not formed by any such process; for it was, if it was the product of anything, the product of an intelligent will operating in the production of preconceived results by the exercise of superhuman and infinite wisdom and foresight.

When we turn to a department in which human influence has largely or wholly shaped the phenomena, we find numerous special creations that are not attributable to the operation of any law of development or evolution such as is supposed to have led to the production of one species of animal out of another, or out of several previous species. In short, a survey of all the departments of Nature leads to the conclusion that while there may be phenomena which are properly traceable to the operation of the forces of Nature, or to fixed general systems of production, there is another very large class of the phenomena which owe their existence to special acts of an intelligent will, finite or infinite, human or divine, according as their production required superhuman power or admitted of the efficacy of man's intervention.

The way is now somewhat cleared for an examination of Mr. Spencer's application of the law of evolution to the gradual formation of different species of animals out of one or more previous species, without any act of special creation intervening anywhere in the series. We have seen that this alleged law is not of universal force as the cause of all the

phenomena in all the departments of Nature. When we come to apply it as the hypothesis which is to account for the existence of different species of animals of very different types, we must remember that we are dealing with organisms endowed with life, and, although we can not sufficiently explain what life is, we know that animated organisms are brought into being by systems of production that are widely different from the modes in which inanimate matter may have been or has been made to assume its existing forms. Bearing this in mind, we come to the arguments and proofs by which Mr. Spencer maintains the immense superiority of the evolution hypothesis over that of special creations, in reference to the animal kingdom. It must be remembered that this is a department in which man can have had no agency in producing the phenomena, for whatever may have been the slight variations produced by human interference with the breeding of animals domesticated from their wild condition, we must investigate the origin of species as if there had never been any human intervention in the crossing of breeds, because that origin is to be looked for in a sphere entirely removed from all human interference. Man himself is included in the investigation, and we must make that investigation in reference to a time when he did not exist, or when he did not exist as we now know him.

One of the favorite methods of Mr. Spencer consists in arraying difficulties for the believers in special creations, which, he argues, can not be encountered by their hypothesis, and then arguing that there are no difficulties in the way of the hypothesis of evolution. His position shall be stated with all the strength that he gives to it, and with all the care that I can bestow upon its treatment. He puts the argument thus: In the animal kingdom individuals come into being by a process of generation—that is to say, they arise out of other individuals of the same species. If

we contemplate the individuals of any species, we find an evolution repeated in every one of them by a uniform process of development, which, in a short space of time, produces a series of astonishing changes. The seed becomes a tree, and the tree differs from the seed immeasurably in bulk, structure, color, form, specific gravity, and chemical composition ; so that no visible resemblance can be pointed out between them. The small, semi-transparent gelatinous spherule constituting the human ovum becomes the newly-born child ; and this human infant "is so complex in its structure that a cyclopædia is needed to describe its constituent parts. The germinal vesicle is so simple that it may be defined in a line. Nevertheless, a few months suffice to develop the one out of the other, and that, too, by a series of modifications so small that were the embryo examined, at successive minutes, even a microscope would with difficulty disclose any sensible changes. Aided by such facts, the conception of general evolution may be rendered as definite a conception as any of our complex conceptions can be rendered. If, instead of the successive minutes of a child's foetal life, we take successive generations of creatures, if we regard the successive generations as differing from each other no more than the foetus did in successive minutes, our imaginations must indeed be feeble if we fail to realize in thought the evolution of the most complex organism out of the simplest. If a single cell, under appropriate conditions, becomes a man in the space of a few years, there can surely be no difficulty in understanding how, under appropriate conditions, a cell may, in the course of untold millions of years, give origin to the human race." *

Here, then, we have a comparison between what takes place in the development of the individual animal in the

* "Biology," i, pp. 349, 350.

space of a few years, and what may be supposed to take place in the successive generations of different creatures through untold millions of years. We turn then to the proof, direct or indirect, that races of entirely distinct organisms have resulted from antecedent races by gradual transformation. Direct proof sufficient to establish the progressive modifications of antecedent races into other races is not claimed to exist; yet it is claimed that there are numerous facts of the order required by the hypothesis which warrant our acceptance of it. These facts are the alterations of structure which take place in successive generations of the same species, amounting, in the course of several generations of the same race, to additions and suppressions of parts. These changes among the individuals of the same race, comprehended in what is scientifically called "heredity" and "variation," are exhibited by the transmission of ancestral peculiarities of structure, by their occasional suppression in some individuals of the race and their reappearance in others, and by a difference in the relative sizes of parts. These variations, arising in successive short intervals of time, are said to be quite as marked as those which arise in a developing embryo, and, in fact, they are said to be often much more marked. "The structural modifications proved to have taken place since organisms have been observed is not less than the hypothesis demands—bears as great a ratio to this brief period as the total amount of structural change seen in the evolution of a complex organism out of a simple germ bears to the vast period during which living forms have existed on earth." *

* "Biology," i, p. 351. I am not quite sure that I understand what Mr. Spencer means by "direct" proof. In the passage immediately following the sentence last quoted, he speaks of "the kind and quantity of *direct evidence* that all organic beings have gradually arisen," etc., whereas, in a previous passage, he had admitted that the facts at present assignable in *direct* poof of this hypothesis are insufficient. I presume he meant insuffi-

The difficulty that is thus prepared for the hypothesis of the special creation of species may now be stated. There is a professed conception of the ultimate power which is manifested to us through phenomena. That conception implies omnipotence and omniscience, and it therefore implies regularity of method, because uniformity of method is a mark of strength, whereas irregularity of method is a mark of weakness. "A persistent process, adapted to all contingencies, implies greater skill in the achievement of an end than its achievement by the process of meeting the contingencies as they severally arise." And, therefore, those who adopt the notion of the special creation of species do, it is said, in truth impair the professed character of the power to which they assume that the phenomena of the existence of species are to be referred, whereas the hypothesis of the evolution of species out of other species is much more consistent with the professed conception of the ultimate power.

In this claim of superiority for the evolution hypothesis, the learned philosopher seems to have been almost oblivious of the fact that he was dealing with animal organisms in two aspects: first, in regard to the method by which individuals of the same species come into existence; and, second-

cient in number. (Compare "Biology," i, pp. 351 and 352). Now, I should say that *direct* proof of the hypothesis that all animal organisms have arisen successively out of one another would require more or less positive evidence of such occurrences; and that the proof which is afforded by what has taken place within the limits of a single species in the course of successive generations would be *indirect* evidence of what may have taken place in the evolution of different species, because it requires the aid of analogy to connect the two. I am not aware that there is supposed to be any proof of the evolution of species out of species, excepting that which is derived from what has taken place in single races in the development of the ovum into the infant, the development of the infant into the mature animal, and the limited varieties of structure appearing among individuals of the same race. As I go on through the examination of Mr. Spencer's argument, it will appear whether there are grounds for regarding this kind of reasoning as satisfactory or the reverse.

ly, in regard to the method by which different species have come into existence. In the first case, regularity of method is evinced by the establishment of a uniform process of procreation and gestation. This process, while retaining throughout the different classes of animals one fundamental and characteristic method, namely, the union of the sexes, is widely varied in respect to the time of gestation, the foetal development, and the nourishment of the young before and after birth. There is no difficulty whatever in discovering the great reason for which this system of the reproduction of individuals was established. The tie that it makes between parents and offspring, and more especially the tie between the female parent and the offspring, was obviously one grand end for which this system of giving existence to individuals was adopted; and although the instinct which arises out of it is in some species feeble and almost inactive, it rises higher and higher in its power and its manifestations in proportion as the animals rise in the scale of being, until in man it exhibits its greatest force and its most various effects, producing at last pride of ancestry, and affecting in various ways the social and even the political condition of mankind. But how can any corresponding connection between one race of animals and another, or between antecedent and subsequent species, be imagined? The sexual impulse implanted in animals leads to the production of offspring of the same race. The desire for offspring keeps up the perpetual succession of individuals, and love of the offspring insures the protection of the newly born by the most powerful of impulses. But what can be imagined as an analogous impulse, appetite, or propensity which should lead one species to strive after the production of another species? Is it said that the different species are evolved out of one another by a process in which the conscious desires, the efforts, the aspirations of the preceding races play no part? This is certainly true, if there

was ever any such process as the evolution of species out of species ; and it follows that, in respect to one great moral purpose of a process, there is no analogy to be derived from the regularity and uniformity of the process by which individuals of the same species are multiplied. Moreover, in regard to the latter process, we know that a barrier has been set to its operation ; for Nature does not now admit of the sexual union between animals of entirely distinct species, and we have no reason to believe that it ever did admit of it at any period in the geological history of the earth.

Still further : In what sense are special creations “irregularities of method” ? In what sense are they “contingencies” ? And if they are “contingencies,” how does it imply less skill to suppose that they have been met as they have severally arisen, than would be implied by supposing that they have been achieved by a uniform process adapted to all contingencies ? This notion that something is derogated from the idea of omnipotence and omniscience by the hypothesis that such a power has acted by special exercises of its creating faculty in the production of different orders of beings as completed and final types, instead of allowing or causing them to be successively evolved out of each other by gradual derivations, is neither logical nor philosophical. In no proper sense is a method of action an irregular method unless it was imposed upon the actor by some antecedent necessity, which compelled him to apply a method which was made uniform in one case to another case in which the same kind of uniformity would not be indispensable. The uniformity of the process by which individuals of the same species are multiplied is a uniformity for that particular end. The regularity in that case is a regularity that has its special objects to accomplish. The uniformity and regularity of a different method of causing different types of organisms to exist, so long as the object

is always effected in the same way, is just as truly a regularity and uniformity for that case, and just as completely fulfills the idea of infinite skill. That such creations are specially made, that they are independently made, and that each is made for a distinct purpose and also for the complex purposes of a varied class of organisms, does not render them contingencies arising at random, or make the method of meeting them an occasional, irregular, spasmodic device for encountering something unforeseen and unexpected. The very purposes for which the distinct organisms exist—purposes that are apparent on a comprehensive survey of their various structures and modes of life—and the fact that they have come into existence by some process that was for the production of the ends a uniform and regular one, whether that process was special creation or evolution, render the two methods of action equally consistent with the professed conception of the ultimate power. On the hypothesis of special creations so many different types of organism as the Creator has seen fit to create have been made by the exercise of a power remaining uniformly of the same infinite nature, but varying the products at will for the purposes of infinite wisdom.

What, again, does the learned author mean by meeting “contingencies” “as they have severally arisen”? This suggestion of a difficulty for the believers in special creations seems to imply that the distinct types of animal organisms arose somehow as necessities outside of the divine will, and that the Almighty artificer had to devise occasional methods of meeting successive demands which he did not create. The hypothesis of special creations does not drive its believers into any such implications. The several distinct types of animal organisms are supposed to have arisen in the divine mind as types which the Almighty saw fit to create for certain purposes, and to have been severally fashioned as types by his infinite power. They are

in no sense "contingencies" which he had to meet as occasions arising outside of his infinite will. A human artificer has conceived and executed upon a novel plan a machine that is distinguishable from all other machines. He did not create the demand for that machine; the demand has grown out of the wants of society; and the artificer has met the demand by his genius and his mechanical skill, which have effected a marked improvement in the condition of society. In one sense, therefore, he has met a "contingency," because he has met a demand. But the infinite Creator, upon the hypothesis of his existence and attributes, does not meet an external demand; there is no demand upon him; he creates the occasion; he makes the different organisms to effectuate the infinite purposes which he also creates; the want and the means of satisfying the want alike arise in the infinite wisdom and will. Such is the hypothesis. We may now, therefore, pursue in some further detail the argument which maintains that this hypothesis is of far inferior strength to that of evolution, as the method in which the Almighty power has acted in the production of different animal organisms.

First we have the analogy that is supposed to be afforded by what takes place in the development of a single cell into a man in the space of a few years, and an alleged correspondence of development by which a single cell, in the course of untold millions of years, has given origin to the human race. Granting any difference of time which this comparison calls for, and substituting in place of the successive moments or years of an individual life, from the formation of the ovum to the fully developed animal, the successive generations of any imaginable series of animals, the question is not merely what we can definitely conceive, or how successfully we can construct a theory. It is whether the supposed analogy will hold; whether we can find that in the two cases development takes place in the

same way or in a way that is so nearly alike in the two cases as to warrant us in reasoning from the one to the other. In the case of the development of the single cell into the mature animal, although we can not, either before or after birth, detect the changes that are taking place from minute to minute, the infinitesimal accretions or losses, we know that there is a perpetual and unbroken connection of life maintained from the moment when the foetus is formed to the moment when the mature animal stands before us. Break this connection anywhere in the process of development, and life is destroyed; the development is at once arrested. It is this connection that constitutes, as I presume, what the learned author calls the "appropriate conditions," in the case of the production of the individual animal; it is, at all events, the one grand and indispensable condition to the development of the cell into the foetus, of the foetus into the newly born child, and of the child into the man. Now, if we are to reason from this case of individual development to the other case of successive generations of creatures differing from each other in the same or any other ratio in which the perfect man differs from the ovum, the foetus, or the newly born child, which are all successive stages of one and the same individual life, we ought to find in the successive generations of the different creatures some bond of connection, some continuity of lives with lives, some perpetuation from one organism to another, that will constitute the "appropriate conditions" for a corresponding development from a single cell through the successive types of animal life into the human race. Without such connection, continuity, perpetuation from organism to organism, shown by some satisfactory proof, we have nothing but a theory, and a theory that is destitute of the grand conditions that will alone support the analogy between the two cases. If anywhere in the supposed chain of successive generations of different animals the continuity of animal

and animal is broken, the hypothesis of special creations of new organisms must come in : for we must remember that we are reasoning about animal life, and if the continuity of lives with one another is interrupted, the series terminates, just as the series between the ovum, the foetus, the child, and the man terminates, at whatever stage it is interrupted by a cause that destroys the mysterious principle of life. It is therefore absolutely necessary to look for some proof which will show that in the supposed series of successive generations of animals out of antecedent types, by whatever gradations and in whatever space of time we may suppose the process of evolution to have been worked, there has been a continuity of life between the different types, a perpetuation of organism from organism, a connection of lives with lives.

We now come to another supposed analogy, on which great stress is laid by the evolution school, and especially by Mr. Spencer. Individuals of the same family are found to be marked by striking peculiarities of structure, ancestral traits, which appear and disappear and then appear again, in successive generations. This is obviously a case where the "appropriate conditions" are all comprehended in the connection of life with life. When we trace the pedigree of a single man or any other individual animal back to a remote pair of ancestors, we connect together in an unbroken chain the successive generations of parents and offspring. If the chain is anywhere broken, so that direct descent can not be traced throughout the series, we can not by direct evidence carry the peculiarities of family traits any further back than the ancestor or pair of ancestors with which we can find an unbroken connection of life with life. We do indeed often say in common parlance that an individual must have a trace of a certain blood in his veins, because of certain peculiarities of structure, complexion, or other tokens of descent, even when we can not

find a perfect pedigree which would show where the infusion of the supposed blood came in. But although it might be allowable, in making out the descent of an individual man or any other animal, from a certain ancestor or pair of ancestors, to aid the pedigree by strong family or race resemblance, even when a link is wanting, it could only be for the purpose of establishing a pedigree, a connection of lives with lives, that such collateral evidence could be resorted to. If by direct proof of an unbroken descent a full pedigree is made out, or if, when some link is wanting, the collateral proof from strong family or race resemblances is sufficient to warrant the belief that the link once existed, we might accept it as a fact that the individual descended from the supposed ancestors in a direct line, or that some peculiarity of blood came into his constitution at some point in the descent of individuals from individuals.*

* I have stated here, in reference to the pedigree of an individual, a far more liberal rule of evidence than would probably be allowed in courts of justice, where anything of value was depending upon the establishment of a descent from a certain ancestor. But I have purposely suggested the broadest rule that can be applied to family or race resemblances as a means of aiding a pedigree in popular determination or in a *judicium rusticum*. For example, suppose that there were persons now living in this country who trace their descent from the English husband of Pocahontas, the daughter of an Indian chief, and from her. They bear, we will suppose, the family name of the Englishman whom she is known to have married, and perhaps one of them bears very strong resemblance to the Indian race in features, complexion, and hair. In a judicial trial of this person's supposed pedigree I do not suppose that these resemblances, if they constituted his sole evidence, together with the name of Rolfe which he bears, and which a certain number of his ancestors may have borne before him, would be received as evidence of his descent from the Indian girl whose name was Pocahontas, and who married an Englishman of the name of Rolfe more than two centuries ago. It would be necessary to make some proof of the whole pedigree by the kind of evidence which the law admits in such cases, and then the resemblances of the individual to the Indian race might possibly be received as confirmatory proof, in aid of the proof derived from

Can we apply this mode of reasoning to the evolution of distinct types of animals out of antecedent and different types? The very nature of the descent or derivation that is to be satisfactorily established requires a connection of lives with lives, just as such a connection is required in making out the pedigree of an individual animal. We must construct a pedigree for the different classes or types of animals through which, by direct or collateral evidence, we can connect the different organisms together, so as to warrant the belief that by the ordinary process of generation these animals of widely different organizations have been successfully developed out of each other, life from life, organisms from organisms. The hypothesis is, that from a single cell all the various races and types of animals have in process of time been gradually formed out of each other, through an ascending scale, until we reach the human race, whose race pedigree consists of a series of imperceptible formations, back to the single cell from which the whole series proceeded. This, we must remember, is not a case of the evolving production of different forms of inanimate matter, but it is the case of the evolving production of different forms of animal life out of other preceding and different forms, by the process of animal generation.

Of direct evidence of this evolution of species, it can not be said that we have any which will make it a parallel case with the direct evidence of the descent of an individual from parents and other ancestors. We have different animal organisms that are marked by distinctions which com-

the family name of Pocahontas's English husband, from reputation, written or oral declarations of deceased witnesses, family documents, ancient grave-stones, and the like. In popular judgment most persons would be apt to accept the family name of Rolfe and the apparent trace of Indian blood as sufficient proof of the descent of the individual from the Indian girl who married John Rolfe. But in a court of justice these facts would go for nothing without some independent proof of the pedigree.

pel us to regard them as separate species, and there is no known instance in which we can directly trace a production of one of these distinct species out of another or others by finding a connection of lives with lives. Even in the vegetable kingdom, with all the crosses for which Nature has made such wonderful and various provision, we do not find such occurrences as the production of an oak out of the seed of an apple, or the production of an orange-tree out of an acorn. We do not gather grapes of thorns or figs of thistles. There are barriers set to miscegenation even in the vegetable world, and we have no direct evidence that at any period in the geological history of the earth these barriers have been crossed, and very little indirect evidence to warrant us in believing that they ever have been or ever will be. In the animal kingdom such barriers are extremely prominent and certain. We not only have no direct evidence that any one species of animal was at any period of the earth's history or in any length of time gradually evolved out of another distinct species, but we know that the union of the sexes and the production of new individuals can not take place out of certain limits; that, while Nature will permit of the crossing of different breeds of the same animal, and so will admit of very limited variations of structure, she will not admit of the sexual union of different species, so as to produce individuals having a union of the different organisms, or a resultant of a third organism of a different type from any that had preceded it. Is it, for example, from mere taste or moral feeling that such occurrences as the sexual union between man and beast have not been known to have produced a third and different animal? We know that it is because the Almighty has "fixed his canon" against such a union in the case of man and in the cases of all the other distinct animal organisms; and to find this canon we do not need to go to Scripture or revelation, although we may find it there also.

We are remitted, therefore, to indirect evidence, and in considering this evidence we have to note that we have nothing but an imaginary pedigree, or one hypothetically constructed, to which to apply it. In tracing the pedigree of an individual animal, we have a certain number of known connections of life with life; and where it becomes necessary to bridge over a break in the connection so as to carry the line back to an earlier ancestor, we may perhaps apply the collateral evidence of family or race resemblance to assist in making the connection with that particular ancestor a reasonably safe deduction. But in the case of the hypothetical pedigree which supposes the human race to have been evolved from a single cell through successive organisms rising higher and higher in the scale of being, we have no known connections of lives with lives to which to apply the collateral proofs. The collateral proofs are not auxiliary evidence; they are the sole evidence; and unless they are such as to exclude every other reasonable explanation of the phenomena which they exhibit excepting that of the supposed evolution, they can not be said to satisfy the rules of rational belief in the hypothesis to which we apply them.

What, then, is the indirect and collateral evidence? It consists, as we have already seen, of two principal classes of phenomena: first, resemblances of foetal development which are found on comparing the foetal growth of different species of animals; second, resemblances in the structure of different species of animals after birth and maturity. These various resemblances are supposed to constitute proof of descent from a common stock, which may be carried back in the series as far as the resemblance can be carried, at whatever point that may be. Thus, in comparing all the vertebrata, we find certain marked peculiarities of structure common to the whole class: the deduction is, that all the vertebrate animals came from a common stock. In

comparing all the mammalia, we find certain marked peculiarities of structure common to the whole class : the deduction is that all the mammalia came from a common stock. Going still further back in the supposed series, we come to the amphibians, as the supposed common stock from which the vertebrate and mammalian land animals were derived ; and, comparing the different classes of the amphibians, we find certain resemblances which point to the fish inhabitants of the water as their common stock ; and then we trace the more highly organized fishes through the more lowly organized back to the aquatic worm, which may itself be supposed to have been developed out of a single cell.*

The resemblances of structure, wherever we make the comparison between different species, are referable to an ideal plan of animal construction, followed throughout a class of animals, and adjusted to their peculiar differences which distinguish one species from another, just as in the vegetable world there is an ideal plan of construction of trees followed throughout a class of plants, and adjusted to the peculiar differences which distinguish one kind of tree from another. As between man and the monkey, or between man and the horse, or the seal, or the bat, or the bird, there are certain resemblances in the structure of the skeleton, which indicate an identity of plan, although varied in its adjustments to the distinguishing structure of each separate species of animal. In a former chapter, I have shown why the adoption of an ideal plan of a general character is consistent with what I have called the "economy of Nature" in the special creation of different species. On a careful revision of the subject, I can see no reason to

* See the table of the Darwinian pedigree of man, *ante*. Any other mode of arranging the order of evolution that will admit of the application of the steps of supposed development to what is known of the animal kingdom, will equally serve to illustrate the theory.

change the expression, or to modify the idea which it was intended to convey, and which I will here repeat. It is entirely consistent with the conception of an infinite and all-wise creating power, to suppose that in the formation of a large class of organisms, all the constructive power that was needed for the formation of a general plan was exercised throughout the class, and that there was super-added the exercise of all the power of variation that was needful to produce distinct species. Repetition of the same general plan of construction is certainly no mark of inferiority of original power, if accompanied by adaptations to new and further conditions. It is a proof that in one direction all the necessary power was used, and no more, and that in producing the distinct organisms the necessary amount of further power was also used. If we follow the resemblances of structure that may be traced through all the animals of a varied class, we shall find that they may be referred, as a rational and consistent hypothesis, to this method of giving to each animal its characteristic formation. If this is a rational hypothesis, it is so because it is consistent with all the observable phenomena; and consequently, the opposite hypothesis that all these phenomena of resemblances and differences are due to the law of evolution does not exclude every other explanation of their existence.

To apply this now to one of the comparisons on which great stress is laid—the comparison between the brain of man and that of the ape. Two questions arise in this comparison: 1. Do the resemblances necessarily show that these two animals came from a common stock? 2. Do the resemblances necessarily show that man was descended from some ape through intermediate animals by gradual transformations? And, when I ask whether the comparison necessarily leads to these conclusions, I mean to ask whether the resemblances point so strongly to the conclu-

sions that they must rationally be held to exclude every other hypothesis.

Prof. Huxley furnished to Mr. Darwin a very learned note, in which he stated the results of all that is now known concerning the resemblances and differences in the structure and the development of the brain in man and the apes. The differences may be laid aside in the present discussion, because it is not necessary, for my present purpose, to found anything upon them. But the resemblances, just as they are stated by the eminent anatomist, without regard to controverted details, are the important facts to be considered. The substance of the whole comparison is that the cerebral hemispheres in man and the higher apes are disposed after the very same pattern in him as in them; that every principal "gyrus" and "sulcus" of a chimpanzee's brain is clearly represented in that of a man, so that the terminology which applies to one answers for the other; that there is no dispute as to the resemblance in fundamental character between the ape's brain and man's; and that even the details of the arrangement of the "gyri" and "sulci" of the cerebral hemispheres present a wonderfully close similarity between the chimpanzee, orang, and man.* These are said to be the result of a comparison of the adult brain of man and the higher apes; and, although it is claimed by some anatomists that there are fundamental differences in the mode of their development which point to a difference of origin, this is denied by Huxley, who maintains that there is a fundamental agreement in the development of the brain in man and apes. His views of the facts for the purpose of the present inquiry may be accepted without controversy, not only because he is an authority whose statements of facts I am not disposed to dispute, but because it is

* Darwin's "Descent of Man," Prof. Huxley's note, p. 199 *et seq.*

not necessary to dispute them. What, then, do they show ?

They show that there are animals known as apes and animals known as men, whose brains are found to be fundamentally constructed upon the same general plan, with strong resemblances throughout the different parts of the organ ; and the first question is, Do these resemblances show that the two animals came from a common stock ? Upon the theory that man has resulted from the gradual modifications of the same form as that from which the apes have sprung, the resemblances in the structure of their respective brains are claimed as having a tendency to show that there was an animal which preceded both of them, and which was their common ancestor, in the same sense in which an individual progenitor was the common ancestor of two other individuals, whether one of these two individuals was or was not descended from the other in a direct line. On the other hand, upon the hypothesis of the special creation of the ape as one animal, and the special creation of man as another animal, there was no common stock from which the two animals have been derived, and the resemblances of their brains point to the adoption of a general plan of construction for that organ, or its construction upon the same model, and the adaptation of that model to the other parts of the structure, and the purposes of the existence of each of the two animals. Without again repeating the argument which shows that the latter hypothesis is perfectly consistent with the professed conception of the infinite power, I will now inquire whether, on the former hypothesis, we have anything to which we can apply the evidence of resemblance as a collateral aid in reaching the conclusion that these two animals were derived from a common progenitor, or from some antecedent animal whose brain and other parts of the structure became modified into theirs by numerous intermediate gradations.

Between the higher apes, or between any of the apes and any known antecedent and different animal, no naturalist has discovered the intermediate link or links. Darwin supposes that there was some one extremely ancient progenitor from which proceeded the two main divisions of the *Simiadæ*—namely, the Catarrhine and Platyrrhine monkeys, with their sub-groups. This extremely ancient progenitor is nothing but a scientific hypothesis; or, to use a legal phrase, it had nothing but a constructive existence. It is necessary to believe in the principle of evolution, in order to work out the hypothesis of this creature from which the two great stems of the *Simiadæ* are supposed to have proceeded. Here, then, we have the case of a pedigree or succession of animal races, the *propositum* of which has no known existence. Next we have two known divisions of the *Simiadæ*, or monkeys; but, between them and their imaginary common progenitor, we have no known intermediate animals constituting the gradations of structure from the progenitor to the descendants. The whole chain has to be made out by tracing resemblances among the animals of a certain class that are known, then applying these resemblances to the supposed divergencies from the structure of a supposed progenitor, and then drawing the conclusion that there was such a progenitor. It may be submitted to the common sense of mankind, whether this is a state of facts which will warrant scientists or philosophers in using toward those who do not accept their theory quite so much of the *de haut en bas* style of remark as we find in the writings of Mr. Spencer.* If the researches of geologists had ever

* Mr. Spencer observes that the hypothesis of special creations is one "which formulates absolute ignorance into a semblance of positive knowledge. . . . Thus, however regarded, the hypothesis of special creations turns out to be worthless—worthless by its derivation; worthless in its intrinsic incoherence; worthless as absolutely without evidence; worthless as not satisfying a moral want. We must therefore consider it as counting

discovered any remains of an animal that would fulfill the requirements, and thus stand as the progenitor of the *Simiada*, the case would correspond to that of a known individual from whom we undertake to trace the descent of another individual through many intermediates; and in such a case strong family resemblances of various kinds might possibly afford some aid in making out the pedigree as a reliable conclusion. But there is no means of connecting the Old World and the New World apes with any but an unknown and imaginary progenitor. Darwin himself frankly tells us that "the early progenitor of the whole Simian stock, including man," is an undiscovered animal, which may not have been identical with, or may not even have closely resembled, any existing ape or monkey.*

Passing from the supposed common progenitor to the resemblances between the brain of the higher apes and the brain of man, we come to the question whether these resemblances show that man was descended from any of the Simian stock through intermediate animals by gradual transformation. Here the case is in one respect different; for the animals that are to be compared are known, and their respective brains have been subjected to close anatomical scrutiny. This part of the process of evolution begins from one true species, the ape, and ends in another true

for nothing, in opposition to any other hypothesis respecting the origin of organic beings." There is a great deal more in the same tone. (See "Biology," i, pp. 344, 345, and *passim* throughout Chapters II and III of Part III of that work.) Mr. Darwin, who is sufficiently positive, is much more moderate, and in my opinion a much better reasoner, although I can not subscribe to his reasoning or his conclusions. A rather irreverent naval officer of my acquaintance once extolled a doctrinal sermon, which he had just heard preached by a Unitarian clergyman, in this fashion: "I tell you what, sir, the preacher did not leave the Trinity a leg to stand upon." Probably some of Mr. Spencer's readers think that he has equally demolished the doctrine of special creations.

* "Descent of Man," p. 155.

species, the man. We are unable to trace the man and the ape to a common progenitor race; but we find the ape possessed of a brain which strongly resembles man's. I have searched diligently in the writings of naturalists for a sound reason which ought rationally to exclude the hypothesis that the brain of the ape was formed upon the same ideal plan as the brain of man, each animal being a distinct species and separately created. Anatomical comparison of the two brains shows that, whether they were separately planned upon the same general model, or the one was derived from the other by a process of gradual transformation through successive intermediate animals, the resemblances are consistent with either hypothesis. We are remitted, therefore, to an inquiry for the evidence which will establish the existence of a race or races of animals through whom there descended to man the peculiar structure of brain found in one of the classes of apes—namely, the Catarrhine or Old World monkeys. If such intermediate races could be found, their existence at any period anterior to the period of man's appearance on earth would have some tendency to show that man was descended from one of the families of apes, and this tendency would become stronger in proportion to the number of successive links in the family chain that could be made out. But not one of these links is known to have existed. There is an assumption that man, "from a genealogical point of view, belongs to the Catarrhine or Old World stock" of monkeys; and this assumption is claimed to be supported by the fact that the character of his brain is fundamentally the same as theirs.

A brain is an organ which, upon the hypothesis of an independent creation of distinct species of animals, would be expected to be found in very numerous species, although they might differ widely from each other. In all the vertebrate animals this organ is the one from which, by its connection with the spinal chord, the central portion of the

nervous system, that system descends through the arches of the vertebræ, and thence radiates to the various other organs of the body. The brain is the central seat of sensation, to which are transmitted, along certain nerves, the impressions produced upon or arising in the other organs ; and it is the source from which voluntary activity is transmitted along other nerves to organs and muscles that are subjected to a power of movement from within. The office which such an organ performs in a complex piece of animal mechanism is therefore the same in all the vertebrate animals in which it is found ; and it would necessarily be found to be constructed upon the same uniform plan, and with just the degree of uniformity and adaptation which would fit it to perform its office in the particular species of animal to which it might be given. In point of fact, we find this office of the brain performed in all the vertebrate animals upon the same uniform plan, with the necessary adaptations to the various structures of the different animals. Resemblances, therefore, in the convolutions of different parts of this organ, as found in different vertebrate animals, however close they may be, prove nothing more than the adoption of a general plan for the production of objects common to the whole class of the vertebrate animals ; and unless we can find other and independent proof that one species was descended from another by connection of lives with lives through successive generations, the hypothesis of special creations of the different species is not excluded by the facts.

Let us now further examine the supposed kinship of man with the monkey, as evidenced by the similarity of the structure of the brains of the two animals, in reference to the supposed process of evolution as the means of accounting for the origin of two species so essentially distinct. How has it happened that different species have become completed and final types, transmitting, after they have

become completed, one and the same type, by the ordinary process of generation, and not admitting of the sexual union with any other distinct species? On the theory of the evolution of animal out of animal, we must suppose that at some time the secondary causes of natural and sexual selection have done their work. It ends in the production of a species which thereafter remains one and the same animal, and Nature has established a barrier to any sexual union with any other species. If we give the rein to our imaginations, and, taking the process of evolution as it is described to us, suppose that in the long course of countless ages the struggle for existence among very numerous individuals has led to gradual transformations of structure which the sexual selection has transmitted to offspring, and so a new animal has at length been formed through the successive "survivals of the fittest," we reach an animal of a new species, and that species, under no circumstances, produces any type but its own, so far as we have any means of knowledge. All the knowledge respecting the ape that has been accumulated shows only that this species of animal, since it became a completed type, has procreated its own type and no other. Whatever struggle for existence the individuals of this type have had to undergo, whatever modifications of structure or habits of life the survival of the fittest individuals of this type may have produced from the earliest imaginable period until the present time, the fact remains that this species of animal is a completed and final product. At the same time we have another completed and final type of animal known as man, which, so long as he has been known at all, is a distinct and peculiar species. Between the brain of this animal and the brain of the other we find certain strong resemblances. In each of them this organ is a structure performing the same office in the animal mechanism, with adaptations peculiar to the varying structure of each of them. In order

to justify the conclusion that the one animal is a modified descendant from the other, so as to exclude the hypothesis that the resemblances of any one or of all of their respective organs was a result of the adoption of a general plan in special creations of distinct species, we ought to find some instance or instances in which the completed animal called the ape has been developed into an animal approaching more nearly to man than the man, as he is first known to us, approached to the first ape that is known to us. Without such intermediate connections, the analogy of the descent of individuals from other individuals of the same species will not hold. There is nothing left but resemblances of structure in one or more organs, which are just as consistent with the hypothesis of special creations as with that of evolution. Strong resemblances of structure and in the offices of different organs may be found between man and the horse, but upon no theory of evolution has it been suggested that man is descended from the horse, or from any other animal to which he bears more or less resemblance, excepting the monkey; and it is quite possible that naturalists have been led unconsciously to make this exception by external resemblances of the monkey and the man, by the imitative power of the inferior animal when it comes in contact with man, and by some of its habits when found in its wild and native haunts.

CHAPTER VI.

The doctrine of evolution, according to Herbert Spencer, further considered.

IN the last two preceding chapters I have examined what Mr. Spencer regards as the direct supports of the doctrine of evolution. I have now to consider the different orders of facts which, as he claims, yield to it indirect support. These are the facts derived from classification, from embryology, from morphology, and from distribution. An explanation is here needful of the sense in which he uses these respective terms, before the reader, who is not accustomed to them, is called upon to understand and appreciate the argument :

1. By classification is meant an arrangement of organic beings in some systematic manner, according to attributes which they have in common, and which may form the principle of a division into different classes or families. Pointing out that in the early history of botanical and zoölogical science the tendency was to make classifications according to a single characteristic, Mr. Spencer reminds us that later naturalists, by attending to a greater number of characteristics, and finally to the greatest number that can be found to be common to various classes of vegetable and animal organisms, have constructed systems of classification which, in place of a linear or a serial order, have exhibited the alliances of different groups, then the sub-groups, and the sub-sub-groups, so that the divergences and redivergences become developed, while the resemblances

which obtain are preserved throughout the whole class. But it is at once apparent that, although classification, on whatever principle it is conducted, may be valuable as a means of fixing in the mind the resemblances or differences of structure that obtain in the different orders of organized beings, as, for example, among the vertebrate or the invertebrate animals, the flowering or the flowerless plants, the seeds naked or the seeds inclosed in seed-vessels, yet that any other system of classification, based upon other resemblances or differences which actually present means of grouping or separating the different families of organized beings, is just as valuable an aid in the investigation of facts. How far any classification affords an argument, or the means of constructing an argument, which will yield a support to the doctrine of evolution superior to that which it yields to the doctrine of special creations, is of course a question.

2. Embryology : This is the term employed to express that branch of inquiry which is concerned in a comparison of the increase of different organisms through the stages of their embryonic life, and in noting at different stages of this growth the characters which they have in common with each other ; the resemblances of structure which at corresponding phases of a later embryonic stage are displayed by a less extensive multitude of organisms ; and so on step by step, until we find the class of resembling embryos becoming narrower and narrower, and then we finally end in the species of which a particular embryo is a member. This process of tracing and eliminating embryonic resemblances is said to have “a profound significance” ; because, beginning with a great multitude of resemblances between the embryonic development of different organisms, it reveals the divergences which they take on, and through every successive step we find new divergences, by means of which “we may construct an embryological tree, expressing the developmental relations of the organisms, resembling the

tree which symbolizes their classificatory relations." We thus arrive at "that subordination of classes, orders, genera and species, to which naturalists have been gradually led," and which is said to be "that subordination which results from the divergence and redivergence of embryos, as they all unfold."* On this mode of comparing the embryonic development of different organized beings Mr. Spencer builds a scientific parallelism, which indicates, as he claims, a "primordial kinship of all organisms," and a "progressive differentiation of them," which justifies a belief in an original stock from which they have all been derived. In what way this method of investigation destroys or tends to destroy the hypothesis of special creations, or how it affords an important support to the doctrine of evolution, will be considered hereafter.†

3. Morphology, or the science of form, involves a comparison of the structure of different organisms in their mature state; an ascertainment of the resemblances between their structures, and of the community of plan that exists between them. Here, as in the aids derived from classification and embryology, it is claimed that the fundamental likenesses of forms of structure have a meaning which is altogether inconsistent with the hypothesis of predetermined

* "Biology," i, p. 366.

† "In the presence of the various genealogical trees of animal descent which have been put forward so frequently of late, a judicious skepticism seems the attitude best warranted by the evidence yet obtained. If so many similar forms have arisen in mutual independence, then the affinities of the animal kingdom can never be represented by the symbol of a tree. Rather, we should conceive of the existence of a grove of trees, closely approximated, greatly differing in age and size, with their branches interlaced in a most complex entanglement. The great group of apes is composed of two such branches; but their relations one to another, to the other branches which represent mammalian groups, and to the trunks from which such branches diverge, are problems still awaiting solution."—*Encyclopædia Britannica*, article "Apes."

typical plans pursued throughout immensely varied forms of organisms.

4. Distribution : This is the term applied to the phenomena exhibited by the presence of different organisms in different localities of the globe ; or, as Mr. Spencer phrases it, "the phenomena of distribution in space." These phenomena are very various. Sometimes, it is said, we find adjacent territories, with similar conditions, occupied by quite different faunas. In other regions, we find closely allied faunas in areas remote from each other in latitude, and contrasted in both soil and climate. The reasoning, as given by Mr. Darwin and adopted by Mr. Spencer, is this : that "as like organisms are not universally or even generally found in like habitats, nor very unlike organisms in very unlike habitats, there is no predetermined adaptation of the organisms to the habitats." "In other words," Mr. Spencer adds, "the facts of distribution in space do not conform to the hypothesis of design." The reason why they do not is claimed to be that there are impassable barriers between the similar areas which are peopled by dissimilar forms ; whereas there are no such barriers between the dissimilar areas which are peopled by dissimilar forms. The conclusion is, "that each species of organism tends ever to expand its sphere of existence—to intrude on other areas, other modes of life, other media." That is to say, there is a constant competition among races of organisms for possession of the fields in which they can find the means of subsistence and expansion ; and this leads to new modes of existence, new media of life, new structures and new habitats.

The reader can now retrace his steps, and advert to the facts that are relied upon, under the four heads of the argument :

1. With regard to the argument derived from classification : it is to be observed that any system of classification is in a certain sense artificial, and at all events is manifestly

conventional. But, in order that no injustice may be done to this branch of the argument for evolution, I shall state it in its full force. The classifications which naturalists make of the different organized beings according to their resemblances and differences reveal the fact of unity amid multiformity. This fact it is said points to propinquity of descent, "which is the only known cause of the similarity of organic beings." It is the bond, hidden indeed by various degrees of modification, but nevertheless revealed to us by the classifications which display the resemblances. Again, we have, it is said, in the influence of various conditions of animated organisms, "the only known cause of divergence of structure." Classification reveals to us these divergences. We have, then, the bond of resemblances which indicate propinquity of descent, and the divergences of structure produced by varying conditions of life. Put the two together, and we have remarkable harmonies of likenesses obscured by unlikenesses; and to this state of facts it is claimed that no consistent interpretation can be given, without the hypothesis that the likenesses and the unlikenesses were produced by the evolution of organisms out of organisms by successive generation, through a great lapse of time.

This argument contains no inconsiderable amount of assumption. While it may be true that some naturalists do not assign any cause for the similarity which obtains among organic beings excepting their descent from a common ancestral stock, it is not true that the similarity of structure is inconsistent with the hypothesis of another cause, namely, the adoption of a general plan of structure for a large class of organisms, and an intentional variation in those parts of structure which mark the divisions of that class into species that are very unlike. It is true that evolutionists treat with scorn the idea of a pattern of structure followed throughout a class of animals, but made by designed adaptations to

coalesce with differences that mark the peculiarities which distinguish one organism of that class from all the others. Mr. Spencer, for example, observes that "to say that the Creator followed a pattern throughout, merely for the purpose of maintaining the pattern, is to assign a motive which, if avowed by a human being, we should call whimsical."

Let us now follow this mode of disposing of the hypothesis of special creations, by adverting to some of the facts that are adduced in its summary condemnation; and, although the passage which I am about to quote is found in Mr. Spencer's work under the head of morphology, the illustration applies equally well to his argument from classification. Speaking of fundamental likenesses of structure, he says: "Under the immensely varied forms of insects, greatly elongated like the dragon-fly, or contracted in shape like the lady-bird, winged like the butterfly, or wingless like the flea, we find this character in common—there are primarily twenty segments. These segments may be distinctly marked, or they may be so fused as to make it difficult to find the divisions between them. This is not all. It has been shown that the same number of segments is possessed by all the *Crustacea*. The highly consolidated crab, and the squilla with its long, loosely-jointed divisions, are composed of the same number of somites. Though, in the higher crustaceans, some of these successive indurated rings, forming the exo-skeleton, are never more than partially marked off from each other, yet they are identifiable as homologous with segments, which, in other crustaceans, are definitely divided. What, now, can be the meaning of this community of structure among these hundreds of thousands of species filling the air, burrowing in the earth, swimming in the water, creeping about among the sea-weed, and having such enormous differences of size, outline, and substance, as that no community would be suspected between them? Why, under the down-covered

body of the moth and under the hard wing-cases of the beetle, should there be discovered the same number of divisions as in the calcareous framework of the lobster? It can not be by *chance* that there exist just twenty segments in all these hundreds of thousands of species. There is no reason to think it was *necessary*, in the sense that no other number would have made a possible organism. And to say that it is the result of *design*—to say that the Creator followed this pattern throughout, merely for the purpose of maintaining the pattern—is to assign a motive which, if avowed by a human being, we should call whimsical. No rational interpretation of this, and hosts of like morphological truths, can be given except by the hypothesis of evolution; and from the hypothesis of evolution they are corollaries. If organic forms have arisen from common stocks by perpetual divergences and redivergences—if they have continued to inherit, more or less clearly, the characters of ancestral races, then there will naturally result these communities of fundamental structure among extensive assemblages of creatures, that have severally become modified in countless ways and degrees, in adaptation to their respective modes of life. To this let it be added that, while the belief in an intentional adhesion to a predetermined pattern throughout a whole group is totally negatived by the occurrence of occasional deviations from the pattern, such deviations are reconcilable with the belief in evolution. As pointed out in the last chapter, there is reason to think that remote ancestral traits will be obscured more or less according as the superposed modifications of structure have or have not been great or long maintained. Hence, though the occurrence of articulate animals, such as spiders and mites, having fewer than twenty segments, is fatal to the supposition that twenty segments was decided on for the three groups of superior *Articulata*, it is not incongruous with the

supposition that some primitive races of articulate animals bequeathed to these three groups this common typical character—a character which has nevertheless, in many cases, become greatly obscured, and in some of the most aberrant orders of these classes quite lost.” *

Whatever may be the explanation suggested by one or another hypothesis as to the mode in which this uniformity of structure came to exist, it is certain that it does exist. Twenty segments are found in hundreds of thousands of species which are immensely different from each other in size, outline, substance and modes of existence. Here, then, is a plan. There is a pattern, on which all these different organisms are constructed with a common peculiarity. It is averred that this could not have been the result of design, because this would be to impute to the Creator a whimsical motive, namely, that he followed the pattern throughout a vast group of different organisms merely for the purpose of following it. On the contrary, it may be contended that this uniformity of plan, this repeated pattern, affords the highest probable evidence of design; and that the supposed whimsicality of motive will entirely disappear as soon as we reach a purpose which may have had very solid reasons for this uniformity of structure. When we reason about the works of the Creator, we are reasoning about the methods of a being who, we must suppose, is governed by a purpose in all that he does. In reasoning about the methods of such a being, it is entirely unphilosophical to suppose that he has done anything merely for the sake of doing it, or for the sake of exercising or displaying his powers in repetitions that had no practical value. In order to reason consistently with the supposed attributes of the Creator, we should endeavor to find the value of any given pattern which we discover in a certain very large class of organisms differing widely from each other in other respects; and in

* “Biology,” i, pp. 380–382.

order to find that value it is by no means essential to make out that the particular plan of construction was necessary to the making of any organism whatever. The true question is, not whether twenty segments were necessary to the construction of any organism, but whether, in each of the different species, this peculiar number of divisions was useful to each particular organism. If naturalists of the evolution school, instead of looking at everything through the medium of a certain theory, would in their dissection, for example, of the framework of the lobster, the body of the moth, and the body of the beetle, furnish us with facts which would show that these twenty divisions are of no use either for strength, or resistance, or suppleness, or adaptation to what is contained within them, we should have a body of evidence that could be claimed as tending to overthrow the hypothesis of intentional design. They might then speak of the repetition of this pattern as whimsical, upon the hypothesis that it was a repetition by design. But so little is done by this class of naturalists to give due consideration to the value of such repetitions, and so little heed is paid to the truth that the Creator does nothing that is useless—a truth which all sound philosophy must assume, because it is a necessary corollary from the attributes of the Creator—that we are left without the aid which we might expect from these specialists in natural science. Is it, then, impossible to discover, or even to suggest, that for each of these organisms this number of twenty divisions had a value? If they were of no value, we may safely conclude that they would never have existed, unless we ignore the hypothesis of infinite wisdom and skill. That hypothesis is a postulate without which we can not reason on the case at all. With it, we have as a starting-point the conception of a being of infinite perfections, who does nothing idly, nothing from whim, nothing from caprice, and nothing that is without value to the creature in which it is found.

So that, while we can not in all cases as yet assign that value, we have the strongest reasons for believing that there is a value ; and, instead of asserting that an extensive community of structure throughout a great branch of the animal kingdom has no meaning excepting upon the doctrine of evolution, it is the part of true science to assume that it may have another meaning, and to discover if possible what that other meaning is. This is the part of true science, because it is the part of sound philosophy. There is another remark to be made upon Mr. Spencer's reasoning on this particular case of a community of pattern. He says that it can not be imputed to *chance*. It was, then, either an intentional design, or it came about through the process of descent "from common stocks, which process was at the same time producing perpetual divergences and redivergences." Without turning aside for the present to ask from how many common stocks, it may be shown as in the highest degree probable that the occasional deviations from the pattern did not arise by the evolution process, because that process has in itself an element of chance which is fatal to the theory. The assertion is that "an intentional adhesion to a predetermined plan throughout a whole group is totally negatived by the occurrence of occasional deviations from the pattern." Let this assertion be examined first in the light of facts, and secondly by the absence of facts.

The hypothesis is that some primitive race of articulated animals, possessed by some means of the twenty segments, transmitted this ancestral trait to hundreds of thousands of species having no community of structure in other respects. Unfortunately for the theory, no figures can measure the chances against the preservation of a single pattern through such a multitude of differing organisms descending from a common stock. Infinity alone can express the chances against such a result. While, according to the theory, the deviations from the original type were constantly working

out new organisms of the most diversified forms, until there came to be hundreds of thousands of new species differing from each other in all but this one peculiarity—a diversity which is supposed to have been caused by the fundamental law of evolution—how did it happen that the same law did not break this uniformity of articulation? If it was potent enough to differentiate the enormous multitude of these animals in all other traits, why did it not vary the number of segments with which the primitive race was endowed? Is the law of evolution limited or unlimited? If it is limited in its effects, then there are patterns of animal structure which it has not modified, and the presence of which in hundreds of thousands of different species must be explained as a form of structure designed for some end that was to be common to a great multitude of different beings. If the law of evolution was unlimited in its power, then the community of pattern has had to undergo chances of destruction or discontinuance that are immeasurable; as there can be no measure which will represent to the mind the infinitely diversified and innumerable causes that have produced the dissimilarities which compel a classification into the different species, upon the hypothesis of their descent from a common stock. Grant, too, for the purpose of the argument, that the occasional deviations from the pattern of twenty segments, producing a few groups with a smaller number of articulations, are reconcilable with the belief that some later ancestral form became endowed with the smaller number which it transmitted to its descendants. How came that later ancestral form to be endowed with the smaller number of segments? Was there a still more remote ancestral race, which in some way became possessed of the smaller number, or did the spiders and the mites, in the countless generations of evolution, branch off from ancestral races having the full number of twenty segments? Upon either supposition, what an infinity of chances there

were, against the natural selection of the smaller number, and against its preservation as the unvarying type of articulation found in the spiders and the mites ! The supposition that the number of twenty segments was decided on for the three groups of superior *Articulata* for the mere sake of adhering to a pattern is doubtless unphilosophical. But it is not unphilosophical to suppose that whatever amount of articulation is found in each species was given to it because in that species it would be useful. If in some of the most aberrant orders of these animals the articulation is greatly obscured, or not found at all, the conclusion that it was not needed, or not needed in a like degree, is far more rational than the theory which commits the particular result to an infinity of chances against it ; or which supposes it to have been worked by a process that might have produced a very different result, since it can not be claimed that natural selection works by methods of which any definite result can be predicated more than another.

Thus far I have considered Mr. Spencer's argument from the *Articulata* in the light of the facts that he adduces. Let us now test it by the absence of facts. In a former discussion, I have asked for facts which show, aside from the theory, that any one species of animal, distinctly marked as a continuing type, is connected by intermediate types or forms with any pre-existing race of another character. Take this class of the articulated animals, said to be of hundreds of thousands of different species having no community of form but this of articulation, and now known as perfect organisms, each after its kind. What naturalist has discovered the continuity of lives with lives, which would furnish the steps of descent of any one of this species from an antecedent and a different species ? It is very easy to construct a theory, and from it to argue that there must have been intermediate links, which, if discovered, would show the continuity of lives from lives which

the descent of one organism from another necessarily implies. To a certain extent, within certain limits, the sub-groups and the sub-sub-groups of the articulated class of animals, which classification or morphology reveals, may lay the foundation for a theoretical belief in an ancestral stock from which the different and now perfect forms of these distinct animals may have become developed by successive changes of structure. But the extent to which connected changes can be actually traced in the animal kingdom is extremely limited ; and the important practical question is whether any one fact, or class of facts, has been discovered which will warrant the belief that beings of totally dissimilar forms and habits of life have, without any design, been evolved by the ordinary process of successive generation, through the operation of causes that have gradually modified the structure in all respects save one, and have at the same time enabled or allowed that one peculiarity of structure to escape from the influences which have modified both structure and modes of life in every other respect. Why, for example, upon the hypothesis of descent from a common stock, has that stock deviated under the influences of natural selection into the lobster, the moth, and the beetle, and yet the community of twenty segments of articulation has entirely escaped the effect of those influences ? No reason can be assigned for the fact that it has escaped those influences, excepting that it was originally designed, and was impressed upon the proto-typical stock with such force as to place it beyond the reach of all such causes of modification as those which are ascribed to natural or sexual selection. Without the latter supposition, those causes were just as potent to bring about a modification in the number of articulations as they were to bring about all the astonishing diversities of structure and modes of life that we see, and therefore the most probable conclusion from the fact of this uniformity of the twenty segments is,

that there was a barrier placed in this whole class of organisms, which has limited the modifying force of the supposed process of evolution, for the reason of some peculiar utility in this plan of articulation.

Perhaps it will be said that the process of evolution itself tends to the preservation of whatever is most useful, while the modifications are going on which develop new organs and new structures; and that thus, in the case before us, the twenty segments have been preserved throughout an enormous group by one of the fundamental laws of evolution, so that, if there is any peculiar utility in the twenty segments, that utility has been answered by the very process of gradual descent of one organism from another. But the difficulty with this reasoning is, that while it assumes for the modifying influences of natural and sexual selection a range of fortuitous causes sufficient to change the ancestral type into the acquisition of vastly diversified organs, powers, and modes of existence, so as to constitute new animals, it yet assumes that, by some recognition of a superior and paramount utility in the particular number of segments, the law of evolution has preserved that number from the influence of causes which have changed everything else. Now, the range of causes which was sufficiently varied, accidental, long-continued and complex to produce the diversities of structure in all other respects, by the infinitely modifying influences which have developed new organs and new modes of existence, must also have been of a sufficiently varied, accidental, long-continued, and complex character to have broken this plan of the twenty segments, unless we suppose that in some mysterious and inexplicable manner the different generations of these beings were endowed with some kind of sagacity which would enable them to strive for the preservation of this one peculiarity, or unless we suppose that Nature was ever on the watch to guard them from its destruc-

tion or variation, on account of its peculiar utility. The first supposition is not in accordance with the evolution theory; for that theory rejects all idea of conscious exertion on the part of any of the organisms. The second supposition leads us at once to the inquiry, how came it to be imposed upon a whole group of beings as a law of nature, that whatever utility of structure was of paramount importance to the whole group should be preserved against the modifying influences that were to produce species differing absolutely from each other, through hundreds of thousands of varieties, in every other feature of their existence? Can we get along here without the hypothesis of design? And, if there was such design, how does the fact of this uniformity amid such diversity become an argument against the hypothesis of a Creator? Or, how does it tend to displace the hypothesis of special creations, when we find that the very process of so-called evolution has failed to break the uniformity of a pattern that is conceded not to have been the result of chance, although that pattern was exposed to just as many and as powerful causes of modification as those which are assumed to have brought about the modifications in every other feature of the animal existence? The truth would seem to be, that the uniformity amid so great a diversity was either the result of a design which placed it out of the reach of all the modifying influences, or else it has, by a most incalculable result, escaped from the effect of those influences by a chance in which the ratio of one to infinity can alone measure the probability of such an escape.

Let us now advert to another of Mr. Spencer's illustrations of the futility of the "supernatural" and of the rationality of the "natural" interpretation.* This illus-

* I use these terms with quotation-marks, because I do not admit any philosophical antagonism such as they are intended to imply.

tration is derived from what are called "homologous" organs; and the particular instance selected is the vertebral column.* There are creatures, such as snakes, a low order of the vertebrate kingdom, in which the bony axis is divided into segments of about the same dimensions from end to end, for the obvious advantage of flexibility throughout the whole length of the animal. But in most of the higher vertebrata, some parts of this axis are flexible and others are inflexible; and this is especially the case in that part of the vertebral column called the sacrum, which is the fulcrum that has to bear the greatest strain to which the skeleton is exposed, and which is yet made not of one long segment or vertebra, but of several segments "fused together." Mr. Spencer says: "In man there are five of these confluent sacral vertebræ; and in the ostrich tribe they number from seventeen to twenty. Why is this? Why, if the skeleton of each species was separately contrived, was this bony mass made by soldering together a number of vertebræ like those forming the rest of the column, instead of being made out of one single piece? And why, if typical uniformity was to be maintained, does the number of sacral vertebræ vary within the same order of birds? Why, too, should the development of the sacrum be the roundabout process of first forming its separate constituent vertebræ, and then destroying their separateness? In the embryo of a mammal or bird, the substance of the vertebral column is, at the outset, continuous. The segments that are to become vertebræ, arise gradually in the midst of this originally ho-

* "Homology" is defined by lexicographers as "the doctrine of similar parts." "Homologous organs" is a term used by scientific writers to describe organs having a relation of some proportion to each other. In this particular case of the vertebral column, the different parts of the column are treated as if they were different organs, and they are said to be homologous organs in the same animal, because they bear a certain relation or ratio of proportion to each other.

mogeneous axis. Equally in those parts of the spine which are to remain flexible, and in those which are to grow rigid, these segments are formed, and that part of the spine which is to compose the sacrum, having passed out of its original unity into disunity by separating itself into segments, passes again into unity by the coalescence of these segments. To what end is this construction and reconstruction? If, originally, the spine in vertebrate animals consisted from head to tail of separate movable segments, as it does still in fishes and some reptiles—if, in the evolution of the higher vertebrata, certain of these movable segments were rendered less movable with respect to each other, by the mechanical conditions to which they were exposed, and at length became relatively immovable—it is comprehensible why the sacrum formed out of them should continue ever after to show more or less clearly its originally segmented structure. But on any other hypothesis this segmented structure is inexplicable.”

We here see the predominating force of a theory which refuses all possible rationality to any hypothesis but its own. The confident tone with which facts are arrayed and are then pronounced inexplicable upon any other hypothesis than that which the writer asserts, without one scintilla of proof of their tendency to exclude every other supposition, renders the refutation of such reasoning a wearisome task. But there is here one plain and sufficient answer to the whole of the supposed difficulty. The evolution theory, in this particular application of it, is that originally there were vertebrate animals in which the spine consisted of separate movable segments from head to tail, as it does now in fishes and reptiles; but, as the higher vertebrata were evolved out of these lower forms, the movable segments were rendered less movable with respect to each other, and at length in the sacrum the segments became relatively immovable, and yet the originally segmented structure was

retained in this part of the column, by force of the propinquity of descent from an antecedent type which had the whole column divided into movable segments. Upon no other hypothesis, it is asserted, is this result explicable.

Mr. Spencer's analysis of the sacrum is somewhat defective. It is, as he says, that part of the vertebrate column which in the higher class of vertebrate animals is, during foetal life, composed, like all the rest of the column, of distinct vertebrae. These vertebrae, like the others, are flexible in the foetal stage, but after birth they become coalesced or united into one piece, instead of remaining in separate pieces. Thus far, Mr. Spencer's description is, I am informed by anatomists, correct. But the questions which he propounds as if they were unanswerable upon the assumption that this change is inexplicable upon any other hypothesis than that of the evolution of the higher vertebrata out of the lower vertebrate animals, and that the sacrum, with its continuous piece, has retained the segmented outward form by force of the descent, demand closer consideration. Let us trace the process of formation in the human species, and then see what is the just conclusion to be derived from it. In the embryonic condition, the substance which is to form the vertebral column is continuous. As the foetus is developed, this substance separates itself into the segments which are called vertebrae, and these segments remain flexible and movable throughout the column. After birth, the five lower segments become united in what is substantially one piece, but of course the marks of the original segments remain. This is what occurs in the origin and growth of the individual. Now, looking back to the period when this species of animal did not exist, and supposing it to have been specially created in the two related forms of male and female, endowed with the same process of procreation and gestation that has been going on ever since there is any recorded or traditionary

knowledge of the race, why should not this very growth of the sacrum have been designed, in order to produce, after the birth of the individual, that relative rigidity which would in this part of the vertebral column be useful to an animal destined to an upright posture of the whole skeleton and to the habits and life of a biped? And, if we extend the inquiry to other species, why should we not expect to find, as in the case of an oviparous vertebrate like the ostrich, a repetition of the same general plan of forming the spinal column, for the same ultimate purpose, with such a variation in the number of original segments that are to constitute the sacrum as would be most useful to that bird, thus establishing for the ostrich a sacrum that in a reptile or a fish would not only not be required, but would be a positive incumbrance? Upon the hypothesis of special creations of the different species of vertebrate animals, every one of Mr. Spencer's questions, asked as if they were unanswerable, can receive a satisfactory solution. Thus, he asks, "Why, if the skeleton of each species was separately contrived, was this bony mass [the sacrum] made by soldering together a number of vertebræ like those forming the rest of the column, instead of being made [aboriginally] in one single piece?" The answer is, that in the establishment of the process of gestation and foetal growth, if a human artificer and designer could have devised the process, he would have selected the very one that now exists, for certain obvious reasons. First, he would have designedly made the process to consist, in the embryo, of a division of the substance which was to form the vertebral column in a continuous and uniform division into segments, because the whole column is to have at first the flexibility that may be derived from such a division. Secondly, when the time was to arrive at which the formation of the sacrum, with its practical continuity of a single piece, was to commence, he would select the number of the lower vertebræ that would

make a sacrum most useful to the particular species of animal, and would weld them together so as to give them the relative rigidity and action of a single piece. But as the whole formation is the result of a growth of the sacrum out of a part of the slowly forming column originally divided into vertebræ, the marks of these separate vertebræ would remain distinguishable, while they would cease to have the mechanical action of separate vertebræ.

Another of Mr. Spencer's questions is, "Why, if typical uniformity was to be maintained, does the number of sacral vertebræ vary within the same order of birds?" The answer is the same as that which assigns a reason for all other variations in the skeleton of animals of the same order but of different varieties, namely, the special utility of the variations in the number of sacral vertebræ that would be most useful in that variety. The typical uniformity maintained is a uniformity in the process of growth and formation, down to a point where the variations are to come in which mark one animal from another; and I have more than once had occasion to suggest that the typical uniformity, and its adaptation to the varying requirements of different beings, is the highest kind of moral evidence of the existence, wisdom, and power of a supreme artificer, and that it militates so strongly against the doctrine of evolution that, without more proof than can possibly be claimed for that doctrine, we ought not to yield to it our belief.

The theory that the original condition of all vertebrate animals was that of separate movable segments throughout the spinal column, as it is now in fishes and some reptiles, and that in the evolution of the higher vertebrates out of these lower forms, certain of these movable segments were rendered less movable with respect to each other by the mechanical conditions to which the successive generations were exposed, until at length the sacrum was formed, is undoubtedly a theory that excludes all design of an infinite artificer,

and all intention whatever. It is a theory which relegates the most special contrivances and the most exact adaptations to the fortuitous operation of causes that could not have produced the variations of structure and at the same time have preserved the typical uniformity. It is certainly a theory which we should not apply to the works of man, if we were investigating products which seemed to be the result of human ingenuity and skill, but of the origin of which we had no direct evidence. In such a case, we should not shut our eyes to the proofs of intentional variations and adaptation, or, if we did, our speculations would not be likely to command the assent of cultivated and sound reasoners. We may treat the works of Nature by a system of logic that we should not apply to the works of man, but if we do, we shall end in no tenable results. The principal and in fact the only essential distinction to be observed between the works of Nature and the works of man relates to the degree of power, intelligence, and skill in the actor. If we assume, as we must, that in the one case there was an actor, applying will, intelligence, and power to the properties of matter, and molding it into certain products and uses, and that in the other case there was no actor, but that all products and results are but the ungoverned effects of what are called natural laws in contradistinction to all intentional purposes, we must argue upon principles that are logically and diametrically inconsistent in themselves, and at variance with fundamental laws of reasoning.

I will now advert to an omission in Mr. Spencer's analysis of the sacrum, which overlooks one of the strongest proofs of intentional design afforded by that part of the spinal column. We have seen what was its general purpose and growth, and the process of its formation. We have now to note its variations in the male and the female skeleton. In the male, the sacrum, thus formed before birth, after birth answers to and performs its ultimate function of a compara-

tively rigid and inflexible piece of bone, and it is provided with no other special characteristic. In the female, on the contrary, there is a most remarkable adaptation of this piece to the function of maternity. While all the upper vertebræ of which this piece was originally composed are welded together after birth in the female as in the male, in the female the lowest segment of all remains for a certain time flexible relatively to the upper part of the sacrum, in order to admit of the necessary expansion of the pelvis during the passage of the infant from the womb of the mother. In the normal condition of females of all the vertebrate orders, this flexibility of the lower part of the sacrum continues while the period of possible maternity continues. If in any individual female it happens to be wanting during the period of possible conception, delivery can not take place without danger to the mother or the offspring, or both. Hence, in very bad cases, nature has to be assisted by extraordinary means. But in the normal condition of the female sacrum, this flexibility, so essential in the process of safe delivery, is always found, and its special purpose is known to every anatomist, while it has no existence in the structure of the male. Is this distinction to be accounted for by the same kind of reasoning that undertakes to account for all the other great distinctions between the related forms of male and female, which reproduce their kind by a common process of the sexual union, namely, that this division of male and female came about by a habit that resulted now in the production of a male and now in the production of a female, from tendencies that were ungoverned by any special purpose? Must we not conclude, however inscrutable are the causes that determine the sex of a particular infant, that the sexes themselves were specially ordained? And if they were specially ordained, how are we to account for the special construction and function of each of them, without the interposition of a special design? And when we find

a structure in the female obviously designed for a special purpose, and not existing in the male, are we to conclude that some particular race of females, in some remote period of antiquity, among the countless generations of the vertebrata, found that this flexibility of the sacrum would be highly convenient to them, and, having adopted it as a habit, transmitted it, as a specially acquired peculiarity of structure, to their female descendants? This is all very well as a theoretical speculation, but as a speculation it is entirely defective, because it assigns the peculiarity of structure to a cause that could not have produced it. On the other hand, the hypothesis of its special creation assigns it to a cause that could have produced it, and its existence is among the highest of the multitudinous evidences of intentional design and special formation.

Wherein consists the irrationality of the hypothesis that a plan of construction was intentionally, and with supreme skill, framed for very different beings, to answer in each of them a common purpose? The asserted irrational character of this hypothesis consists in nothing but a denial that there was a Creator. It comes down to this, if it comes to anything: because, if we assume that there was a Supreme Being who took any care whatever of the complex and manifold product that we call nature—if we suppose that he ordained anything—we must suppose that his power to construct was boundless, and that a repetition of his plans wherever they would be useful, to answer the beneficent and diversified ends of infinite skill and benevolence, is just as much in accordance with the whole hypothesis of his attributes as it is to suppose that he caused anything whatever to exist. If we deny his existence, if we can not satisfy ourselves of it at all, if we suppose that nothing was ordained, nothing was created, but that all these diversified forms of animal organisms grew out of a protoplasmic substance, and that there was never any absolute commence-

ment of organic life on the globe, or any absolute commencement of anything whatever, it is of course idle to speculate upon the adoption or preservation of patterns, as it is equally idle to pursue the theory of evolution through stages which at last end nowhere whatever.*

It may be well to cite Mr. Spencer's final summary of the general truths which he claims to be revealed by morphology, because it will enable the reader to see just where the logical inconsequence of his position occurs: "The general truths of morphology thus coincide in their implications. Unity of type, maintained under extreme dissimilarities of form and mode of life, is explicable as resulting from descent with modification; but is otherwise inexplicable. The likenesses disguised by unlikenesses, which the comparative anatomist discovers between various organs in the same organisms, are worse than meaningless if it be supposed that organisms were severally formed as we now see them; but they fit in quite harmoniously with the belief that each kind of organism is a product of accumulated modifications upon modifications. And the presence, in all kinds of animals and plants, of functionally useless parts corresponding to parts that are functionally useful in allied animals and plants, while it is totally incongruous with the belief in a construction of each organism by miraculous interposition, is just what we are led to expect by the belief that organisms have arisen by progression."†

Without expending much criticism upon the phrase "miraculous interposition," as a description of what takes place in special creation, it is sufficient to say that the act of special creation of a distinct organism is to be first viewed by itself, as if it stood alone in nature, and that it is like any other act of causing a new thing to exist which did not

* See the discussion of how evolution works, *post*.

† "Biology," i, p. 387.

exist before. To this idea should be added the fact that in the creation of an animal organism there is involved the direct formation of a peculiar type of animal, with a capacity of producing other individuals of the same type through a process of generation. When, after having attained this conception of the act of special creation, and contemplated a single instance of the supposed exercise of such a power, we extend our inquiries, we find many other instances of the exercise of the same power ; and then we observe a certain unity of type in some peculiarity of structure, maintained under extreme dissimilarities of form and mode of life. How, then, is this one similarity of pattern, amid such multiformity in other respects, "worse than meaningless," if we suppose that "organisms were severally framed as we now see them" ? The very hypothesis that they were so severally framed carries in itself a meaning which can not be thus summarily ignored ; because that hypothesis implies a power in the Creator to do just what we see. You may deny the power ; but if you admit the existence of the infinite creating power, you are remitted to the inquiry into its probable methods ; and you can no more say that the special creation of distinct organisms, with a certain unity amid a great multiformity, leaves the whole phenomena without a meaning, than you can say that any method which you can suggest is necessarily the only method which will afford a rational meaning in what we see. You must go the length of denying the entire postulate of a Creator, before you can be in a situation to deny the meaning that is involved in the idea of creation ; for that idea implies an absolute power to apply a uniform pattern of structure to a whole class of organisms varied in all other respects. The theory that each kind of organism is a product of accumulated modifications upon modifications, without any special interposition to produce the modified and distinct forms, must be maintained on one of two sup-

positions : either that at some period there was an absolute commencement of organic life in some form, upon this globe, and that then all the other forms which we see were left to be evolved out of that one by the ungoverned accumulation of modifications upon modifications, or else that there was never any absolute commencement of organic life at any time, but that matter, by some peculiar property derived from some source that is not suggested, took on combinations which resulted in some crude form of animated organism, and that then the accumulations of modifications upon modifications followed from some process of generation by which the successive organisms became multiplied and varied. Of the former supposition, I understand Mr. Darwin to have been a representative naturalist. Of the latter, I understand Mr. Spencer to be an advocate. Upon what may be called the Darwinian doctrine, the idea of a Creator, causing to exist at some time some crude form of animal life, is admitted. Upon the Spencerian doctrine, which will be in this respect more closely examined hereafter, I do not see that the idea of a creating power comes in anywhere, either at the commencement of a series of organisms or at any point in that series. But, upon the logical proposition asserted in the passage last above quoted, it is obvious that, unless the idea of a Creator is absolutely denied, the presence of a unity of type amid any amount of dissimilarities of form and mode of life can not be pronounced to be without meaning, because the idea of a Creator implies a power to make that very unity amid the uniformity, which is asserted to be inexplicable without resorting to the theory that it was not made at all, but that it grew out of events over which no superintending or governing power was exercised. Upon this kind of dogmatic assertion there can be no common ground of reasoning.

The assumed incongruity between the facts and the hypothesis of a special creation of each organism is an in-

congruity that arises out of the assumption that such special creation was an impossibility. If once the idea of an infinite creating faculty is assumed as the basis of the reasoning, all seeming incongruity vanishes, and the probable method of that creating power must be determined by the preponderance of evidence. If the power is denied, we must grope our way through systems which impute everything to the properties of substance, without any suggestion of a source from which those properties were derived, and without anything to guide them but the tendencies implanted in them, we know not how or when, and of the origin of which we have not even a suggestion. Some of the speculations of Greek philosophers adverted to in a previous chapter may serve to show us what comes of the omission to conceive of power as abstracted from substance or its properties. The philosophy which first attained to this conception led the way to that conception of an Infinite Being, without whose existence and attributes all speculation upon the phenomena of nature leads to nothing. A belief in his existence and attributes must undoubtedly be attained by an examination of his works, if we set aside the teachings of revealed religion. But if we can not attain it, we have no better means for believing in the doctrine of evolution than we have for believing in any other method by which the phenomena of nature have become what they are.

The question here is, not whether descent of organisms from organisms, with modifications upon modifications, is a supposable theory, but whether it is so satisfactorily shown that it can be said to exclude the hypothesis of a special creation of each organism. There may be parts of structure in one animal which seem to have no functional use, although we should be cautious in making the assumption that they are of no use because we have not yet discovered that use. But let it be assumed that these apparently useless parts in one animal correspond to parts which

in another animal are functionally useful. If there was established for these two separately created animals a like system of procreation and gestation, that system, affected at the same time by a law of growth imposed by the special type of the species, might in one species lead to the presence of parts of which we can not recognize the use, and might in other species lead to the presence of parts of which we can see the use. It does not help to a better explanation to say that there has been an accumulation of modifications upon modifications in the course of an unknown descent of one organism from another. Why did these modifications stop short of the production of a species or of several species in which no resemblance of parts more or less functionally useful could be found? The supposition is that the modifications have been going on through millions of years. Time enough, therefore, has elapsed for the destruction of all uniformity of structure; and the causes of modification are as immeasurable as the period through which they are supposed to have been operating. The imaginary ancestral stock, wherever it is placed in the line of remote descent, had, in its first distinctive existence, a peculiar structure, which it bequeaths to its offspring. In the countless generations of its descendants, modifications of that structure take place, until a new animal is evolved. What preserved any unity of type from the modifying influences? It was not choice on the part of the several descending species; not a conscious exertion to preserve something; it was nothing but the propinquity of descent, which by the law of heredity transmitted certain resemblances. But why was that law so potent that it could preserve a certain unity of type, and at the same time so powerless as not to prevent the modifications which the successive organisms have undergone in all other respects? Or, to reverse the terms of the question, why were the causes of modification sufficiently

powerful to produce distinct species, and yet not powerful enough to eliminate the resemblances which we find obtaining throughout the whole group of animals to which these several species belong? It would seem that here we are not to lose sight of the fact that, in the animal kingdom, procreation never takes place between a male and a female of distinct species, and that we have no reason to believe that it ever did take place. Now, although the evolution hypothesis supposes that, starting from an ancestral stock, the modifications of structure have been produced in offspring descended from parents of that same stock, which have transmitted acquired peculiarities to their immediate progeny, and so on indefinitely, yet there must have been a time when the diverging species became distinct and peculiar organisms, and when it became impossible for any crossing of these organisms to take place. All the supposed modifications, therefore, have taken place within the limits of an actual descent of one kind of animal from another, each successive pair belonging to the species from which they were individually generated. In this descent of lives from lives, there came about changes which in progress of time led to two animals as wide asunder as the man and the ostrich, or as the man and the horse, and yet the causes which were powerful enough to produce these widely diverging species were not powerful enough to break up all unity of plan in some one or more respects. If naturalists of the evolution school would explain how there has come to be, for example, in the skeleton of the *vertebrata*, a bony structure called the spine, in which a certain resemblance and a certain function obtain throughout the whole class, and yet one species creeps upon its belly, another walks on four legs, and another on two, and one flies in the air and another never can do so, and how this could be without any design or special interposition of a creating power, but that the whole of this uniformity amid such

diversity has arisen from acquired habits among the different descendants from an aboriginal stock that had no such habits in either mode of locomotion, and no organs for such modes of life, they would at least be able to commend their theory to a better appreciation of its claims than is now possible to those who want "grounds more relative" than a naked hypothesis.

3. The argument from embryology requires for its appreciation a careful statement of its abstract proposition, and a statement of it in a concrete form. As an abstract proposition, embryology, or the comparison of the development of different organisms under their embryonic stages, shows that in the earliest stage of any organism it has the greatest number of characters in common with all other organisms in their earliest stage; that at a later stage its structure is like the structures displayed at corresponding phases by a less extensive number of organisms; that at each subsequent stage the developing embryo becomes more and more distinguished from the groups of embryos that it previously resembled; and that this divergence goes on, until we reach the species of which the embryo is a member, in which the class of similar forms is finally narrowed to that species.

It seems that Von Baer formulated this generalization of embryologic development into an "embryologic law," which, according to Mr. Spencer, becomes a support to the hypothesis of evolution in this way: Species that had a common ancestry will exhibit a parallelism in the embryonic development of their individual members. As the embryos of the ancestral stock were developed in their growth, so the embryos of the descended species would be developed at corresponding phases in a similar way. As one species diverged from its ancestral stock, there would come about modifications in the development of its embryos, and thus a later ancestral stock would be formed,

which would in turn transmit to its descendants in the development of the embryo less and less resemblances, and so on, until finally the individual animal, at birth, would structurally resemble only the individual infants of its own race.

Here, then, is another remarkable instance of the force of an adopted theory. First, we have a comparison of the embryonic development of different animals from their seminal germs which displays certain phenomena of resemblances and departures. Next, we have the assumption of an ancestral stock, the common origin of all the organisms in the development of whose embryos among its descendants an embryologic law was to work, starting from the visible resemblance of all the germs, then exhibiting structural changes into later ancestral stocks, and so on, until the resemblances are reduced to those which obtain only among individuals of the same species. So that, without the hypothesis, the assumption of an ancestral stock of all the organisms, formed somehow in the course of descent from a germ that gave rise to an animal of some kind, we have nothing to which to apply the embryologic law. We are to infer the embryologic law from the parallelism of embryonic development which prevails in the whole series of animal generation, or from its divergences, or from both, and then we draw from *this law* the inference that the whole series of animals came from some common stock. The difficulty with this whole theory is, as I have more than once suggested, that we have no means, aside from the theory itself, of connecting lives with lives, in the generation of one distinct species out of another. Without some proof of the fact that the human fœtus was a diverging growth out of some ancestral stock that was the same as that from which the fœtus of another animal was a different diverging growth, the embryologic law is no help to us whatever. If this kinship of the human fœtus with the

foetus of some other animal can not be found, by tracing the intermediate links which carry them respectively back to their common ancestor, between what animals in respect to their embryonic development can such kinship be found, excepting upon the theoretical assumption of a common origin of the whole vertebral class? If there was such a common ancestral stock, where is it to be placed, what was its character, when did the law of embryologic development begin to operate upon its descendants? Until some facts can be adduced which will have a satisfactory tendency to show the kinship of one animal with another by reason of ancestral descent from a common ancestral stock that was unlike either of them, the phenomena of embryologic development have no tendency to displace the hypothesis of special creations; for, on the latter hypothesis, the phenomena of resemblances and differences in the growth from the germ into the foetus and from the foetus into the newly born infant, evinced by any range of comparison of the different species, would be the same. If man was a special creation, and one of the higher quadrumana was also a distinct and separate creation, the establishment for each of a like process of procreation and gestation would produce all the resemblances of foetal growth that obtain between them, and the ordained differences of their animal destinies would explain all the divergences. Let us see if this is not a rational conclusion.

It is exceedingly difficult for the common reader of such a work as that of Mr. Spencer, on which I am now commenting, to avoid the influence of the perpetual assertion that facts are explicable upon one hypothesis alone. At each step in the argument, the array of facts terminates with the assertion that, upon the hypothesis of design, the facts are inexplicable; and yet we are furnished with no reasoning that has a tendency to show that the facts necessarily exclude the hypothesis of design, or, in other words,

that the facts are inconsistent with that hypothesis. It is essential to understand what is the true scope of the hypothesis of special creation ; for, without a definite idea of what that term implies, we have no proper means of comparing the facts of animal resemblances or differences with the rationality of the hypothesis that they resulted from an intentional design. Recollecting, then, that we are now pursuing the resemblances and divergences that are found in a comparison of the embryologic development of different species of animals, let us endeavor to understand the meaning of what I have suggested at the close of the last preceding paragraph ; namely, the establishment for a large class of animals of a like general system of procreation and gestation, and the ordination of different destinies for the different species of animals belonging to that class. I have said that the two branches of this hypothesis would account for the resemblances in the embryological growth of different animals, and would explain the divergences which obtain among their embryological developments. The first inquiry is, whether this hypothesis presents a true philosophic idea of special creation. The next inquiry is, whether it affords a satisfactory explanation of the phenomena of comparative embryologic development.

We must never lose sight of the one grand postulate of an infinite Creator. This postulate must be conceded to the believers in special creations, because any idea of creation implies a creating power. If we conceive of creation without a Creator, we must stop all argument. Now, the hypothesis of creation, as I have more than once said, implies a being of boundless faculties. There can be absolutely no limitation to the power of such a being, either in respect to the methods by which he will accomplish his objects, or to the number and variety of these objects, or to the purposes for which they are to exist. If we narrow our conception of creating power to anything less than an infi-

nite faculty ; if we suppose it to be restricted in any direction ; if we argue about it as if there were things that it can not do, we shall be without the means of reasoning soundly upon anything that it is supposed to have done. It is quite otherwise when we are reasoning about the operation and effect of secondary causes. There is no secondary cause—no imaginable operation of a fixed quality of substance—no action of any of the properties of substance—that is not limited. The scope of its action may be very wide ; within its sphere it may be enormously potent ; but in its very nature it is bounded.* It is not so with the First Cause of all things ; not so with the Infinite Power which, upon the hypothesis of a First Cause, has established all the physical laws of the universe and all the properties of matter. So that, when we reason about the methods of that infinite creating power, if we find a general system established, or a pattern repeated through a very large class of organisms, the proper inference is, not that the power was limited, but that it has been exercised to the whole extent of what was useful, and in that direction has been exercised no further ; and if we find variations or additional structures incorporated with the repetition of a general pattern, the proper inference is that the unlimited creating power has put forth all the additional exertion and skill needful for the formation of new beings.

What, then, does the establishment of a like system of procreation and gestation imply, upon the supposition of the distinct creation of species ? It implies a certain parallel embryonic development, from the germ to the foetus

* The Greek philosophers, as we have seen, before Plato and Aristotle, found that their systems of causes, which did not involve the idea of power as abstracted from substance, would not account for the phenomena of nature. With all their subtilty and ingenuity, they did not reach the truth that secondary causes are necessarily limited in their action, and that there must be an unlimited cause.

and from the foetus to the new-born infant, throughout a large group of different animals; and this parallelism would in certain stages of the embryonic growth display identity or close similarity of form and structure. But as in each species of animal the distinct creation would necessarily imply a distinct destiny, the parallelism of embryonic form and structure would cease at the point of development at which the characteristic structure of the species would begin to unfold itself. The general system of procreation and gestation common to a whole class of different animals, and the ordained diversity of species, would present the same phenomena of resemblances and differences in the embryonic development that are supposed to be explicable only by the hypothesis of a descent of all the species from a common ancestral stock through the process of evolution.

Notwithstanding the mystery and obscurity in which the process of animal procreation is involved—a mystery and obscurity which will perhaps never be fully solved—we can see enough to warrant some definite conclusions. One of these conclusions is that, in the formation of the germ which becomes developed into the foetus, the male and female parent each contributes some cellular substance to the compound which constitutes that germ. We may safely infer this, because the individual animal becomes a union of characteristics belonging to both the parents, although the traits that are peculiar to one of the parents may be more or less marked in their different offspring, so that in one of the descendants the parental and in another the maternal traits will predominate. But in every descendant from the same pair there is more or less of the peculiarities of each parent plainly discernible. The inference, therefore, may be safely drawn that the male and the female parent each contributes to the formation of the ante-foetal germ some cellular substance, in which resides

the typical characteristic of animal organism which each parent possesses. The compound germ that is thus formed is endowed with the mysterious principle of animal life which admits of growth and development; and whether after its formation the female parent bestows most or bestows least upon the product, that product consists of a union of cellular substances contributed by both the male and the female parent in the sexual act of procreation. This compound resultant germ, in the earliest stage of its formation, like the separate cells of which it is a union, exhibits no visible difference when we compare the ante-fœtal germ of one animal with that of a different animal. Perhaps we shall never be able to detect either chemical or mechanical differences in the cellular substances or in the earliest stage of the compound product which has resulted from their union. But in that compound product there resides a contributory cellular substance derived from each of the parents; and it is a just inference from this fact, and from what we learn when we trace the further development, that there is a peculiar and typical structure impressed upon and inwrapped in this compound germ, which is to grow into a fœtal development by a law of its own. There will at the same time be a particular law of development for each distinct species of animal, and a general law of development for a great variety of species among whom there obtains a common process of the sexual union and of the contribution of male and female cellular substance. When the fœtus becomes formed, there will still be marked resemblances in the different species, before the stage is reached at which the characteristic structure of each species is to begin to unfold itself. But at some time the fundamental difference of structure originally lodged in the cellular substances of which the compound ante-fœtal germ was composed, and impressed upon that germ as the type which was gradually to unfold itself into a distinct being,

will begin to exert its force. The resemblances of structure will become less and less, as the foetus of the different animals approaches to the time of birth. Organs, or appearances of organs, which at one stage of the comparison have seemed to indicate descent from a common ancestral stock, but which may have been only the result of a common process of foetal development, will be found to be varied by force of the original diversity of structure and destiny that was made to reside in the seminal substance of each distinct species of animal; and, at length, this original and intentional peculiarity of structure and being would become perfected at or before the period when birth is to take place, leaving only those resemblances which must obtain in all organisms constructed in certain respects upon a uniform plan, and brought into being by a common process of procreation and gestation.

Let us now see whether this reasoning involves any such unphilosophical or unscientific belief as is supposed. Passing by the often-repeated assertion that the facts of comparative embryologic development are reconcilable only with the belief in evolution, let us advert to some of those facts. "The substitutions," says Mr. Spencer, "of organs and the suppression of organs, are among those secondary embryological phenomena which harmonize with the belief in evolution, but can not be reconciled with any other belief. There are cases where, during its earlier stages of development, an embryo possesses organs that afterward dwindle away, as there arise other organs to discharge the same functions. And there are cases where organs make their appearance, grow to certain points, have no functions to discharge, and disappear by absorption." The concrete illustration of this substitution and suppression of organs is thus given by Mr. Spencer:

"We have a remarkable instance of this substitution in the successive temporary appliances for aërating the blood

which the mammalian embryo exhibits. During the first phase of its development, the mammalian embryo circulates its blood through a system of vessels distributed over what is called the *area vasculosa*, a system of vessels homologous with one which, among fishes, serves for aërating the blood until the permanent respiratory organs come into play. After a time, there buds out from the mammalian embryo a vascular membrane called the allantois, homologous with one which, in birds and reptiles, replaces the first as a breathing apparatus. But while, in the higher oviparous vertebrates, the allantois serves the purpose of a lung during the rest of embryonic life, it does not do so in the mammalian embryo. In implantational mammals it aborts, having no function to discharge; and in the higher mammals it becomes "placentiferous, and serves as the means of intercommunication between the parent and the offspring"—becomes an organ of nutrition more than of respiration. Now, since the first system of external blood-vessels, not being in contact with a directly oxygenated medium, can not be very serviceable to the mammalian embryo as a lung; and since the second system of external blood-vessels is, to the implantational embryo, of no greater avail than the first; and since the communication between the embryo and the placenta among placental mammals might as well or better have been made directly, instead of by metamorphosis of the allantois—these substitutions appear unaccountable as results of design. But they are quite congruous with the supposition that the mammalian type arose out of lower vertebrate types. For, in such case, the mammalian embryo, passing through states representing, more or less distinctly, those which its remote ancestors had, in common with the lower *vertebrata*, develops these subsidiary organs in like ways with the lower *vertebrata*." *

* "Biology," i, pp. 359, 370.

In what way, then, are these substitutions unaccountable as results of design, and why are they any more congruous with the supposition that the mammalian type arose out of the lower vertebrate type? In the first place, it is necessary to have a distinct conception of what is meant by design. In the present case, it means that for a certain large group of animals there was established a system of reproduction by the sexual union of male and female, each contributing a cellular substance peculiar to itself, in the formation of a compound cellular substance in which the separate substances are united, and which is to be developed into the foetus by a law of growth; and as a further design there is wrapped up in the compound germ of each distinct species of animal a typical plan of ultimate form and structure. This typical plan can not be detected in the germ itself, as it is too subtile and obscure even for the microscope; but we have every reason to believe that it is there in all its distinctness of original purpose, because at a later stage of the embryonic development we find a distinct species of animal is the result. This is a conclusion that must be adopted by the evolutionist, as well as by the believer in special creations, because it has nothing to do with the question of how distinct species came to exist. Whether they were designedly and separately created, or were evolved out of one another, the reproductive process by which the individuals of the same species are brought into being alike involves the conclusion that, in the ante-foetal germ of that species, there is somehow involved, in a form so minute that it can not be seen, the type of animal which is to belong to that species, and to no other. Here, then, we have the grand and compound design which is to obtain throughout a whole group of different animals; namely, that they shall multiply in the production of individuals of their own types, by a sexual union, in which the male and the female each contributes a cellular sub-

stance of its own to the formation of a compound germ, and in that germ there is made to reside the typical form and structure of a distinct organism, so minute that we can not see it, but which we must conclude from the result has been put there to be developed by a law of growth ordained for the accomplishment of a certain distinct order of beings. But the very obscurity of this type, in the earliest stage of embryonic development, leads to the conclusion that while it will never be lost, so long as its life is preserved, it will unfold itself in ways that will be equally beyond our ken, until the point is reached where it is no longer obscured, but where it is revealed in all its distinctness of outline and its peculiarity of structure. What is certain and invariable is, that the type peculiar to the species is at some time in the growth of the individual animal perfectly developed. But in the modes of its development through different embryonic stages, there will be variations and substitutions of organs in the different species, but in each distinct species these variations and substitutions will be uniformly the same, because the law of development imposed by the distinct type, while it may operate differently among different species, will always operate in the same way in the same species. Thus in one animal the development from the original type which was implanted in its seminal ante-fœtal germ may at one stage exhibit an organ for which at a later stage another organ will be substituted; and in another animal a seemingly corresponding organ may serve a different purpose, or may altogether abort. These embryologic phenomena, varying in different species, but occurring uniformly in the same species, are necessarily among the most obscure of all the phenomena of animal life, on account of the fact that they take place where we can not watch the changes or modifications as they are taking place during actual fœtal life. But they are no more explicable upon the hypothesis of the descent of distinct animals from

a common stock, than they are upon the hypothesis of distinct creations of species. Upon the former hypothesis, the assumed propinquity of descent implies the preservation of the same mode of embryonic development until it becomes varied by the operation of causes that bring about a new habit of development, and then a fixation in this new habit after a new species or a new ancestral stock is formed ; so that in each distinct species there comes at length to be a uniform process of substituting and suppressing organs, or changing the functions of organs. But how are we to account for the operation of causes that have preserved a parallelism of development, along with the operation of causes that have produced the different modes of development, when all the species are supposed to be derived from a common ancestral stock, which first began to procreate and to develop its descendants in one and the same way ? What are the facts which will enable us to say that the mammalian type arose out of the lower vertebrate types, when we compare the different modes of their embryologic development ? How are we to estimate the chances for a preservation of so much resemblance as exists between the two in their embryologic lives, and the chances for the variations that are observable ? What we can safely conclude is that there is a law which holds each species in a constant repetition of its own foetal growth, according to its unvarying development in the same series of changes, substitutions, or suppressions. But we can not safely conclude that this species became formed in the supposed process of descent from a remote ancestral stock, which may or may not have originally exhibited the same series of changes, substitutions, or suppressions. If the ancestors of the mammalian vertebrates were the kind of animal supposed, we have to find, in order to justify the supposed descent, those states which represent the correspondence between the mode in which the ancestral stock developed

its own embryos, when compared with the mode in which the type of the lower vertebrata developed its embryos, so as to make it reasonably certain that these subsidiary organs derived their several substitutions or suppressions from the process of descent, and not from any special mode of development ordained for each distinct species. We may imagine these states through which the mammalian embryo has passed, but as yet we have only a theory which suggests their existence without facts to support it. The truth would seem to be that this whole subject of comparative embryology, upon the hypothesis of the kinship of all organized beings, or the descent of many distinct species from a common stock, is involved in very great difficulties ; not the least of which is the difficulty of explaining how the diverging descendants from that stock came to be endowed with habits of embryologic life and growth that resulted in the production of very different modes of development, and at the same time preserved for each new species its own peculiar mode of development. To say, for example, that the mammalian embryo passed through states representing, more or less distinctly, those which its remote ancestors had in common with the lower vertebrata, and that it developed certain subsidiary organs in like ways with the lower vertebrata, is merely to state a theory, which, without some evidence that the mammalian embryo was a formation resulting from a connection of lives with lives back to a common ancestor whose embryo was developed as those of the lower vertebrata are, amounts to nothing. Often as this want of evidence has been adverted to, it must be here again pointed out : for the whole argument from embryology, like that derived from a comparison of the forms of mature animals, lacks the support of facts that are essential to show the connection of life with life which descent from a common ancestral stock necessarily implies.

On the other hand, the hypothesis of the distinct crea-

tion of different species deals with the phenomena of embryologic life in a very different way. It supposes the creation of a pair, male and female, and a law of procreation, designed for the multiplication of individuals of a fixed type. It supposes many such creations, each having in its own peculiar germ the characteristic type of organism that will distinguish the mature animal from all the others. It supposes finally a law of development common to all the species the individuals of which are multiplied by the sexual union of male and female ; a law of growth under like conditions, which leads to a parallelism of development until the typical plan of form and structure designed for each distinct animal, and implanted in its germ, begins to take on a mode of development peculiar to that species, and at length the perfect individual of that species is the result. In this hypothesis, therefore, there is no necessity for resorting to any connection with an imaginary ancestral stock of a different type, or for resorting to a theoretical process by which successive generations may be supposed to have gradually arisen out of the ancestral stock by successive changes which have at length resulted in a totally new species. The new species is what is supposed to have been aboriginally created, and to have been placed under its own law for the multiplication of individuals of the same type. In point of simplicity, of comparative certainty, of freedom from accidental causes of variation of which we can predicate no specific result, this hypothesis seems to have a far greater degree of probable evidence in its favor than the theory which entirely lacks the requisite evidence of intermediate connections between the lives of one species with the lives of a remote and different species. For, while it may be truly said that no man ever saw a special creation take place, and while such an act of the infinite power is of a nature that places it beyond the observation of our senses, it is neither inconceivable nor improbable, nor inconsistent

with the idea of the divine attributes which we derive from the study of nature. On the other hand, it is not only equally true that no man ever saw, or in the nature of things ever can see, an evolution of distinct species out of other distinct species, but the whole nature of the supposed process of transformation involves an element of chance which forbids all calculation of the results. How, for example, in this very matter of comparative embryological development on the hypothesis of descent of all the species of the vertebrate animals from a common ancestral stock of a different type, are we to account for the fact that the embryo of any one of the descended species has come to be developed in a mode peculiar to itself and differing from the mode in which the embryo of the ancestral stock was developed? The law of sexual union, under which the individuals of the supposed ancestral stock were multiplied, must have imposed on that species an invincible necessity of reproducing in its offspring the same type that constituted the peculiar organism of the parents, whether these parents were or were not the fittest survivors of their race after the severest struggle for existence which they may have had to undergo. If the pair, or the male of that pair, has in the course of that struggle acquired a new organ, or more completely developed an old one, before the act of procreation takes place, how is it that the ovum is developed into the foetus, and the foetus into the newly born infant, in an invariable mode peculiar to the species to which the parents belonged? Why did not the same causes of variation which are supposed to have changed the ancestral type into one of a new and entirely distinct character, also vary the mode of foetal development? When and how did the new organs become fixed in the type which the parents have transmitted to the offspring? And if they became so fixed in the germ which was formed out of the cellular substance contributed by each of the parents, why do we find in every known species

participating in this process of reproduction a uniform mode of embryologic development peculiar to the species, and exhibiting its own suppressions and substitutions of organs, irrespective of any newly acquired peculiarities in the individual structures of the parents ?

The believer in special creations has to answer no such questions as these. His hypothesis assumes the creation of a pair of animals of a certain distinct species ; a law of procreation and gestation common to a vast multitude of organisms ; and a law of embryologic growth peculiar to each species. Whatever peculiarities of structure may have been possessed by the immediate parents of any individual of any one of these different species—peculiarities which did not separate the parents from their race, but only made them the fittest survivors of their race—those peculiarities would or would not descend to their immediate offspring, according to varying and very inappreciable circumstances. But that which constituted the special type of the race, and especially that which constituted its peculiar mode of development during the embryonic stage, would remain unaffected by these incidental and accidental peculiarities of the parents, because, from all that we can discover, that special type was impressed upon the embryo at the earliest stage of its existence, and constituted the living model that was to be developed into the perfect animal of that species, by a law which placed it beyond the influence of any adventitious and non-essential advantages which the male or female parent may have acquired over other individuals of the same race. So that, if the postulate of a special creation of species be assumed as the groundwork of the reasoning, we have to go through with no speculations about a common ancestral stock of all the species, and we have to account for no phenomena that are exposed to chances which might have produced very different results from those which are open to our observation,

and results of which we can predicate nothing with any degree of certainty. On the hypothesis of the special creation of a species, and an aboriginal pair of each species, with all that this implies, we can with a high degree of certainty predicate most of the phenomena that we have to observe, and more especially so much of the phenomena of embryologic growth of the different species as are open to our investigation after the life of both mother and embryo has become extinct.

It only remains for me to give to this reasoning a concrete application. Take the case made use of by Mr. Spencer in the passage above cited—that of the "allantois," a vascular membrane, which is said to be in the mammalian embryo homologous with one which in the higher oviparous vertebrates, such as the birds and reptiles, replaces what was at first a breathing apparatus, and becomes for them, during the rest of embryonic life, a sort of lung, or an organ that aërates the blood until the permanent respiratory organs come into play. In the mammalian embryo, the first appliance for aërating the blood is described as a system of vessels distributed over the *area vasculosa*, and like that which is first observable for the same purpose in fishes. But, as the mammalian embryo continues to grow, a change takes place. There buds out from it the vascular membrane called the "allantois," which is substituted in the place of the first aërating apparatus. Then a further change takes place, as between the higher oviparous vertebrates and the mammalian vertebrates. In the former, the "allantois" continues to perform the breathing function through the rest of the embryonic life. In the mammalian vertebrates it undergoes two changes: In the implantal mammals, it aborts, having no function to discharge; in the placental mammals it becomes modified into another organ, namely, that which serves to convey nutrition from the mother to the offspring. After birth, it is of course ended.

Now, the reasoning, or rather the assertion, that these substitutions are unaccountable as the results of design, appears to me to be singularly inconclusive. It is quite illogical, according to all philosophic meaning of design as applied to the works of the Creator, or to the works of nature, if that term is preferred, to argue that a particular object could have been better accomplished directly, than by a metamorphosis of an organ from one function to another, or by substitution. The metamorphosis, or substitution, which in such cases we find in nature, is of itself the very highest evidence that the indirect method was the best, if we admit the idea of a Creator, because it was the method chosen by a being of infinite perfections for reasons which we may not be able to discover, but which we must presume to have existed, if we concede that hypothesis of attributes which "design" in this case necessarily implies. But how are these metamorphoses and substitutions any more accountable upon the supposition that the mammalian type arose by generation out of the lower vertebrate types which in their embryonic life exhibited the same changes? The doctrine or theory of evolution does not account for them at all; for, while the doctrine supposes, as matters of pure theory, that there were certain states through which the mammalian embryo passed, which represented more or less distinctly those which it had in common with its assumed remote ancestors, the lower vertebrata, it does nothing more than to suggest the theoretical idea that the mammalian embryo came to develop these subsidiary organs in the mode in which they were developed in the embryo of the lower vertebrata, because it was descended from the lower vertebrata. The varying states through which the embryo passed from the lower vertebrata to the mammalian type, are all hypothetical, and there is, therefore, no basis of fact on which to rest the belief in a common mode of development, as resulting from a connection of lives with

lives between the mammalian type and the types of birds, reptiles, or fishes.

On the other hand, the hypothesis of the special creation of a species implies the simple fact of a designed process of embryonic development for each species, with substitutions of organs and changes of function in certain organs peculiar to that species ; a fact which may well consist in a certain parallelism in the different metamorphoses, and a preservation of the same unvarying changes in the development of each separate embryo. Why these changes should exist, we can not tell ; but their existence is very strong proof that they were designed, or made to take place, for some reason, if we admit the hypothesis of a Creator. For that hypothesis, we must look to a wider class of facts, and to the whole phenomena of nature.

4. We now come to the argument from distribution. This is one of the weakest of the indirect supports of the doctrine of evolution ; but, as it is much relied upon, it must be stated with all the force that it is supposed to have. The facts that are relied upon are these : When we survey the whole surface of the globe, so far as it is known to us, we find, in the first place, that the areas which have similar conditions (of soil and climate), and sometimes, where the areas are nearly adjacent, are occupied by quite different faunas. On the other hand, it is said that areas remote from each other in latitude, and contrasted in soil and climate, are occupied by closely allied faunas. The inference drawn is, that there is no manifest predetermined adaptation of the organisms to the areas, or habitats, in which they are found, because we do not find that like organisms are universally or generally found in like habitats, nor very unlike organisms in very unlike habitats. The conclusion is, that the facts of distribution in space do not conform to the hypothesis of design. In other words, the different animals found in different regions were not spe-

cially designed for those regions, but some of them have extended into regions of a different character ; and when the regions are very unlike there are not found very unlike organisms, but there is a general similarity, or a less extensive variety. There is said, also, to be another important fact, namely, that "the similar areas peopled by dissimilar forms are those between which there are impassable barriers ; while the dissimilar areas peopled by similar forms, are those between which there are no such barriers." Hence is drawn the conclusion that "each species of organism tends ever to expand its sphere of existence—to intrude on other areas, other modes of life, other media." * A good deal of aid is supposed to be derived for this argument respecting animal life by analogies drawn from the vegetable kingdom ; but I can not help thinking that there is much caution to be observed in formulating such analogies into a law of universal application, or into one that relates to the existence of animal organisms. The origin, the multiplication, and the spread of animals involve a principle of life, organization and development which is very different in some important respects from that which obtains in the vegetable world. But, without laying any stress upon this distinction, and without intending to deprive the argument for animal evolution of any aid which it can derive from such supposed analogies, I pass to the specific argument respecting animal distribution. The argument is this : Races of organisms become distributed over different areas, and also through different media. They are thrust by the pressure of overpopulation from their old into new habitats, and as they diverge more widely in space they undergo more and more modifications of structure, by reason of the new conditions on which they enter. Thus, these powerfully incident forces, the new conditions

* "Biology," i, p. 388.

on which the migrating races enter in new regions, vary the structure which they originally brought with them, and which descended to them from the common stock of which they were modified descendants. The widest divergences in space, under such circumstances, will indicate the longest periods of time during which these various descendants from a common stock have been subject to modifying conditions. There will, therefore, come to be, it is said, among organisms of the same group, smaller contrasts of structure in the smaller areas; and, where the varying incident forces vary greatly within given areas, the alterations will become more numerous than in equal areas which are less variously conditioned: that is to say, in the most uniform regions there will be the fewest species, and in the most multiform regions there will be the most numerous species. These hypotheses are said to be in accordance with the facts of distribution in space.*

But there are also facts of distribution through different media. The meaning of this is, that, whereas all forms of organisms have descended from some primordial simplest form, which inhabited some one medium, such as the water, its descendants, by migration into some other medium or other media, underwent adaptations to media quite unlike the original medium. In other words, the earth and the air have been colonized from the water. Numerous facts are adduced in support of this conclusion, which are thus summarized:

There are particular habitats in which animals are subject to changes of media. In such habitats exist animals having, in various degrees, the power to live in both media, consequent on various phases of transitional organization. Near akin to these animals, there are some that, after passing their early lives in the water, acquire more completely the structures fitting them to live on land, to which they then migrate. Lastly, we have closely-allied creat-

* "Biology," i, pp. 390, 391.

ures like the Surinam toad and the terrestrial salamander, which, though they belong by their structures to the class Amphibia, are not amphibious in their habits—creatures the larvæ of which do not pass their early lives in the water, and yet go through these same metamorphoses! Must we, then, think that the distribution of kindred organisms through different media presents an insurmountable difficulty? On the contrary, with facts like these before us, the evolution-hypothesis supplies possible interpretations of many phenomena that are else unaccountable. Realizing the way in which such changes of media are in some cases gradually imposed by physical conditions, and in other cases voluntarily commenced and slowly increased in the search after food, we shall begin to understand how, in the course of evolution, there have arisen those strange obscurations of one type by the externals of another type. When we see land-birds occasionally feeding by the water-side, and then learn that one of them, the water-ouzel, an “anomalous member of the strictly terrestrial thrush family, wholly subsists by diving—grasping the stones with its feet and using its wings under water”—we are enabled to comprehend how, under pressure of population, aquatic habits may be acquired by creatures organized for aerial life; and how there may eventually arise an ornithic type, in which the traits of the bird are very much disguised.

Finding among mammals some that, in search of prey or shelter, have taken to the water in various degrees, we shall cease to be perplexed on discovering the mammalian structure hidden under a fish-like form, as it is in the Cetacea. Grant that there has even been going on that redistribution of organisms which we see still resulting from their intrusions on one another's areas, media, and modes of life, and we have an explanation of those multitudinous cases in which homologies of structure are complicated with analogies. And while it accounts for the occurrence, in one medium of organic types fundamentally organized for another medium, the doctrine of evolution accounts also for the accompanying unfitness. Either the seal has descended from some mammal which, little by little, became aquatic in its habits, in which case the structure of its hind-limbs has a meaning; or else it was specially framed for its present habitat, in which case the structure of its hind-limbs is incomprehensible.*

* “Biology,” i, p. 396.

Along with these phenomena of distribution in space and in medium of life, we have the further element of distribution in time; the facts of which are admitted, however, to be too fragmentary to be conclusive either for or against the doctrine of evolution. Still it is claimed that there is one general truth respecting distribution in time, which is "profoundly significant, namely, that the relations between the extinct forms of life, found by geological exploration, and the present forms of life, especially in each great geographical region, show in the aggregate a close kinship, and a connection which is in perfect harmony with the belief in evolution, but quite irreconcilable with any other belief. As Mr. Darwin has expressed it, there is 'a wonderful relationship in the same continent between the living and the dead.' " *

The argument from distribution is thus summed up by Mr. Spencer :

Given, then, that pressure which species exercise on one another, in consequence of the universal overfilling of their respective habitats—given the resulting tendency to thrust themselves into one another's areas, and media, and modes of life, along such lines of least resistance as from time to time are found—given, besides the changes in modes of life hence arising, those other changes which physical alterations of habitats necessitate—given the structural modifications directly or indirectly produced in organisms by modified conditions—and the facts of distribution in space and time are accounted for. That divergence and redvergence of organic forms, which we saw to be shadowed forth by the truths of classification and the truths of embryology, we see to be also shadowed forth by the truths of distribution. If that aptitude to multiply, to spread, to separate, and to differentiate, which the human races have in all

* "Biology," i, p. 399. It is to be noted that the relationship here referred to is supposed or apparent kinship between the *aggregate* of the surviving and the *aggregate* of the extinct forms which have died out in recent geologic times. But this does not supply the steps of descent by which any one surviving form can be traced back to any one extinct form.

times shown, be a tendency common to races in general, as we have ample reason to assume, then there will result that kind of relation among the species, and genera, and orders, peopling the earth's surface, which we find exists. Those remarkable identities of type discovered between organisms inhabiting one medium, and strangely-modified organisms inhabiting another medium, are at the same time rendered comprehensible. And the appearances and disappearances of species which the geological record shows us, as well as the connections between successive groups of species from early eras down to our own, cease to be inexplicable.*

Passing by what is here said of the aptitude of the human race to multiply, to spread, to separate, and to differentiate—an aptitude which has never resulted in the production of an essentially different animal, or in anything but incidental variations within the limits of the same species—I propose now to apply to this argument from distribution a test which seems to me to be a perfectly fair one, and one which it ought to be able to encounter. If the theory that the different species of animals now known to us have been evolved successively by descent from some primordial simplest form through modifications induced by change of habitation, of medium of life, and accumulation of new structures occurring through an immense period of time, be a sound hypothesis, the process which has evolved superior out of inferior organizations ought, in consistency with itself and with all its supposed conditions, to be capable of being reversed, so as to lead to the evolution of inferior out of superior organisms. For, although the doctrine of evolution has thus far been applied only to facts which are supposed to show an ascent in the scale of being, the argument ought to be equally good for a descent in the scale of being, provided we take care to include all the elements and causes of a change of structure, mode and medium of life, and the necessary element of time, in the operation of the

* "Biology," i, p. 401.

process. The imaginary case that is about to be put shall include all the elements of the evolutionary hypothesis, and will serve to test at least the rationality of that theory.

Let it be supposed, then, that there was a period in the history of this earth when the whole human race, however it originated, was confined to an island, thousands of miles from any other land. This race of men adapted to a life in one medium, the air, may be supposed to have so far advanced in the ruder arts of hunting and fishing, and in the higher art of tillage, as to be able for many generations to support life by what the sea and the land would put within their reach, and by the product which their rude agriculture could extract from the soil, or which the soil would spontaneously yield. But as the centuries flow on, the population begins to press upon the resources of the territory, and the struggle for life becomes very great. At length a point is reached where the supply of food from the land becomes inadequate to sustain the population, and what can be made up from the sea will not supply the deficiency. The population will then slowly decrease, but, while this decrease goes on, there comes in a disturbing cause which will prevent any adjustment of the supply of food to the diminished number of the consumers. The sea begins by almost imperceptible but steadily progressing encroachments to diminish the area of dry land; a change of climate reduces the number of other animals available for human food, and reduces the productive capacity of the earth. Then ensues that struggle for existence which is supposed to entail changes of medium of life, and to induce transformations of structure. The conditions of existence have become wholly changed. The wretched descendants of a once comparatively thriving race are dwelling on a territory which has become a marsh. They have no means of migrating to another territory; they can only migrate to another medium. They begin by feeding exclusively on

what the water will afford. They pass their lives in the pursuit of a prey which lives only in the water, and in this change of life they acquire or develop organs adapted to the new condition, organs which, in such miserable reproduction of their own species as can go on, they transmit to their offspring. Modifications upon modifications accumulate in this way through untold periods of time, until at last a new aquatic or a new amphibious creature is formed, and the difference between that creature and his remote ancestral human stock is as great as that between man and the seal, or between man and any fish that swims. Still, there will be peculiarities of structure retained, which might lead any inhabitant of another world, alighting on this globe and undertaking to trace the origin of this new creature, to the supposition that he was akin to a race of men whose fossil remains he might find buried in some stratum beneath the marsh which was the last habitat of this unfortunate race, when it had all the characteristics of its original type.

Is it conceivable that this transformation could take place? Could such a condition and situation result in anything but the utter extinction of the human race, or, in other words, in an absolute break? Could there be any modifications exhibited by the last survivors of that race other than those which are familiar to us among the varieties of the human species which have never separated themselves from their race, and between whom and their ancestral stock, wherever it was originally placed on this globe, we recognize no fundamental difference of structure, whatever may have been the changes of habitat or conditions of life? Yet the conditions and elements of this imaginary case, which is simply the process of evolution reversed, are just what the evolution theory assumes as the causes of that modification which proceeds from a lower to a higher organism; and whatever may be said of the tendency, through "the sur-

vival of the fittest," to evolve higher out of lower forms of animal life, if we allow time enough for the process, there is no reason, in the nature of things, why corresponding conditions should not lead to a degradation as well as to an elevation in the scale of beings. There is, however, one reason why no such potency should be ascribed to the conditions, either in respect to the one result or the other. That reason is that all such causes of modification, either in the ascending or the descending scale, are so limited in their effects that distinct beings can not be rationally predicated as their product, whereas the power of the Infinite Artificer to give existence to distinct beings is absolutely without limit. If naturalists would turn their attention to the limitations upon the power of all such causes as those which are supposed to work in the process of evolution, and would give us the explanations to which those limitations point, in those cases of local variation which are exhibited by animals that can clearly be traced to a parent form, they would not be compelled to resort to a sweeping theory that refuses all force to any hypothesis but its own.

But now let us go a step further in this imaginary case. Let us suppose that after this new creature, fish or amphibian, descended from the human race, has inhabited the water surrounding the ill-fated island for a million of years, another great change takes place. The water begins to recede from the land by gradations as slow as those by which in the former period it encroached. The land rises from the low level to which it had sunk, by volcanic action. Forests spring up upon the sides of mountains. The soil becomes firm; verdure overspreads the fields; the climate grows genial; the wilderness blossoms as the rose. Allow another million years for this restoration of the territory to an inhabitable condition. Slowly and in an unbroken series of generations the aquatic creatures, descended from the ancient

human inhabitants of the island, emerge from the sea and betake themselves to the land. Modifications upon modifications accumulate, new organs are acquired; the survival of the fittest perpetuates them; the animals ascend in the scale of being, until the human type is again evolved out of the degraded descendants of the population which two millions of years previously dwelt as men upon the island, and carried on in some primitive fashion the simpler arts of human life. Is not this just as supposable as the evolution of the human race out of some lower form of organism? Are not all the elements—time, migration from one medium to another, change of conditions, and what is supposed to lead to the production of different organisms—just as powerful to produce the inferior out of the superior as to produce the superior out of the inferior, and so on interchangeably? The answer in each case is, that all such causes of modification in the animal kingdom are limited; that when once a distinct species is in existence, we have no evidence that it loses its distinct type or merges itself in another, although the earth may be full of evidence that types which formerly existed are no longer among the living organisms.

CHAPTER VII.

Mr. Spencer's agnosticism—His theory of the origin of religious beliefs—
The mode in which mankind are to lose the consciousness of a personal God.

IN a former chapter I had occasion to advert to one of Mr. Spencer's favorite dogmas, namely, the impossibility of an intellectual conception of creation, which he thinks is made apparent by the statement that one term of the relation, the thing created, is something, and the other term of the relation, that out of which the thing was created, is nothing. When I wrote the chapter in which I commented on this extraordinary kind of logic, I felt a little disposed to apologize to my readers for answering it. I had not then met with the fuller statement of Mr. Spencer's peculiar agnosticism which I am now about to quote. The controversy recently carried on between Mr. Spencer and Mr. Harrison was closed by the former in an article entitled "Last Words about Agnosticism and the Religion of Humanity," which appeared in the "Nineteenth Century" for November, 1884. This drew my attention to a passage in Mr. Spencer's "Essays," which he has reproduced in his late article for the purpose of repeating his position against some of the misrepresentations which he complains had been made of it by Mr. Harrison. I have nothing to do with the controversy between these two gentlemen, or with any of the arguments which Mr. Spencer's opponents, be they churchmen or laymen, have employed against him. I take the passage as he has quoted it from his "Essays," for the pur-

pose of making his agnostic views the subject of a more extended commentary than I had bestowed on them in my previous chapter, in writing which I had before me only a passage contained in his "Biology." There is no occasion, however, for altering a word of what I had previously written; for, on a comparison of his position as given in the "Biology," and that given in the "Essays," it appears very plainly that I had not misunderstood him. But as the passage in the "Essays" displays much more fully the peculiar reasoning by which he supports his agnostic philosophy, I should not do justice to him or to my readers if I did not notice it. The passage is the following:

Always implying terms in relation, thought implies that both terms shall be more or less defined; and as fast as one of them becomes indefinite, the relation also becomes indefinite, and thought becomes indistinct. Take the case of magnitudes. I think of an inch; I think of a foot; and having tolerably definite ideas of the two, I have a tolerably definite idea of the relation between them. I substitute for the foot a mile; and being able to represent a mile much less definitely, I can not so definitely think of the relation between an inch and a mile—can not distinguish it in thought from the relation between an inch and two miles, as clearly as I can distinguish in thought the relation between an inch and one foot from the relation between an inch and two feet. And now, if I endeavor to think of the relation between an inch and the 240,000 miles from here to the moon, or the relation between an inch and the 92,000,000 miles from here to the sun, I find that while these distances, practically inconceivable, have become little more than numbers to which I frame no answering ideas, so too has the relation between an inch and either of them become practically inconceivable. Now this partial failure in the process of forming thought relations, which happens even with finite magnitudes when one of them is immense, passes into complete failure when one of them can not be brought within any limits. The relation itself becomes unrepresentable at the same time that one of its terms becomes unrepresentable. Nevertheless, in this case it is to be observed that the almost blank form of relation preserves a certain

qualitative character. It is still distinguishable as belonging to the consciousness of extensions, not to the consciousnesses of forces or durations; and in so far remains a vaguely identifiable relation. But now suppose we ask what happens when one term of the relation has not simply magnitude having no known limits, and duration of which neither beginning nor end is cognizable, but is also an existence not to be defined? In other words, what must happen if one term of the relation is not only quantitatively but also qualitatively unrepresentable? Clearly in this case the relation does not simply cease to be thinkable except as a relation of a certain class, but it lapses completely. When one of the terms becomes wholly unknowable, the law of thought can no longer be conformed to; both because one term can not be present, and because relation itself can not be framed. . . . In brief, then, to Mr. Martineau's objection I reply that the insoluble difficulties he indicates arise here, as elsewhere, when thought is applied to that which transcends the sphere of thought; and that just as when we try to pass beyond phenomenal manifestations to the Ultimate Reality manifested, we have to symbolize it out of such materials as the phenomenal manifestations give us; so we have simultaneously to symbolize the connection between this Ultimate Reality and its manifestations, as somehow allied to the connections among the phenomenal manifestations themselves. The truth Mr. Martineau's criticism adumbrates is that the law of thought fails where the elements of thought fail; and this is a conclusion quite conformable to the general view I defend. Still holding the validity of my argument against Hamilton and Mansel, that in pursuance of their own principle the Relative is not at all thinkable *as such*, unless in contradiction to some existence posited, however vaguely, as the other term of a relation, conceived however indefinitely; it is consistent on my part to hold that in this effort which thought inevitably makes to pass beyond its sphere, not only does the product of thought become a dim symbol of a product, but the process of thought becomes a dim symbol of a process; and hence any predicament inferable from the law of thought can not be asserted.*

* "Essays," vol. iii, pp. 293-296.

In judging of the soundness of this reasoning, the first thing to be done is to determine what we are thinking about when we compare the finite with the infinite, or when, to put it as Mr. Spencer does, we have two terms of a relation, one of which is a thing open to the observation of our senses, and the other of which lies beyond them. In this case, does all thinkable relation lapse, or fade into an impossible conception, when we undertake to conceive of that which lies beyond what we see? Does the relation between the two supposed terms cease to be a continuously existing relation? Or, to quote Mr. Spencer's words, is it true that "insoluble difficulties arise, because thought is applied to that which is beyond the sphere of thought"?

We must be careful to distinguish between the "insoluble difficulties" which arise out of the imperfection of language adequate to give a formal description of a thing, and which may lead us to suppose ourselves involved in contradictions, and the "insoluble difficulties" which may arise out of the impossibility of having a mental representation of that thing. The latter is the only difficulty about which we need concern ourselves; and the best way to test the supposed difficulty as an insuperable one is to take one of the illustrations used by Mr. Spencer—the idea of space. We measure a foot or a mile of space, and then compare it with the idea of endless or (to us) immeasurable space. Figures afford us the means of expressing in language a certain definite number of miles of space, but, beyond the highest figures of which we have definite forms of expression, we can not go in definite descriptions of space. But when we have exhausted all the expressions of number that our arithmetical forms of expression admit, does it follow that we can not conceive of extension beyond that number? On the contrary, the very measure which we are able to express in figures, to a certain extent, in regard both to space and time, gives us the idea of space and

time, and shows us that there must be an extension of both beyond and forever beyond the portion of either which language will allow us definitely to describe. This to us immeasurable and indescribable extent of space or time becomes a thinkable idea, because we are all the while thinking of space or time, whether it is a measurable portion of either, or an immeasurable and endless existence.

Take as another illustration a purely moral idea. We know that there is a moral quality which we call goodness ; an attribute of human character of which we have a clear conception, and which we can describe because it is manifested to us in human lives. When we speak of the moral phenomena to which we give the name of goodness, or virtue, all mankind know what is meant. But human virtue is imperfect, limited, measurable. It may be idealized into something approaching to perfection, but the ideal character thus drawn must fall short of perfection if it is made consistent with human nature. But from human character we derive the idea of goodness or virtue as a thinkable idea. Is the idea of absolute perfection of this quality any less thinkable ? Absolute perfection of moral character can not be described by a definition ; but, as we know that a measurable goodness which we can describe exists, wherein consists the failure or lapse of a thinkable relation, when we reason from that which exists in a measurable degree to that which transcends all degree ? We are all the while thinking of goodness or virtue, whether we think of it as limited and imperfect, or as unlimited and perfect. Take another quality—power. We know that there is such a quality as power, wielded by human beings, and guided by their will. But human power is limited, measurable, and therefore finite. When we reason from the finite power of man to the idea of an infinite and immeasurable power held and wielded by another being, do we strive to conceive of something that is unthinkable because we can only say

that the power of that other being is without limit? We are all the while thinking of power, of the quality of power, whether we think of it as measurable or immeasurable. All qualities and all faculties which are manifested to us in a limited degree, when we conceive of them as unlimited and without degree, become proofs that what exists in a measurable and limited degree may exist without limitation and without degree. Although we can only define the finite, the infinite is not the less a subject of true thinking, because, whether we think of the finite or the infinite, what we are all the time thinking about is the quality of power, and nothing else. In the one case it is limited, in the other it is unlimited, but it is all the time the quality itself of which we are thinking.*

But now let us attend a little more closely to Mr. Spencer's grand objection to this mode of thinking. The reader will be careful to note that what he needs to ascertain is, whether Mr. Spencer's agnostic theory is really sound. To test it, he must inquire just where the supposed difficulty lies. Translated into other language, Mr. Spencer's position is this: In order to keep within the sphere of possible thought, there must be a definite relation between any two ideas, which must not lapse, but the two ideas must be equally capable of mental representation. When one term of the relation is an idea capable of mental representation, as when we think of a thing cognizable by our senses, and the other term of the relation is something that lies beyond them, the law of thought, according to Mr. Spencer, can no longer be conformed to; the relation lapses; the latter term can not be present to the mind; we pass out of the sphere of thought into that which can not be a subject of thought, the unknown and the unknow-

* For the answer to the objection that we thus ascribe anthropomorphic attributes to the Supreme Being, see *infra*.

able. What takes place in this process is assumed to be this: We take certain phenomenal manifestations which we are able to observe and to describe. Out of the materials which these phenomenal manifestations give us, we "symbolize the Ultimate Reality." We do this, by arguing from the phenomenal manifestations which convince us of the existence of a being whom we know and can observe, to the existence of a being in whom we "symbolize" qualities and faculties which the phenomenal manifestations show us to belong to human beings. At the same time we represent to ourselves by the same symbolizing process a connection between the Ultimate Reality and its manifestation, which is allied to the connections among the phenomenal manifestations which we observe in man, or in nature. In other words, we reason from what we see and can measure and describe, to that which we can not see or describe, and we end in a term of the relation which can not be present to the mind, and thus no thinkable relation can be framed.

Whatever may be said of the rational force of the evidence derived from phenomenal manifestations which we can observe when we reason about other phenomenal manifestations which we can not measure, it can not be said that we have reached a term in the relation that is beyond the sphere of thought. What I understand Mr. Spencer to mean when he speaks of "symbolizing" out of the materials which the phenomenal manifestations give us, may be a process liable to error, but it does not involve or lead to the "insoluble difficulties" that are supposed to arise. For example, when, from the existence and power of man, a being whom we know, and whose phenomenal manifestations lead us to a knowledge of his limited faculties, we reason to the existence of a being whose faculties are boundless, we may be in danger of conclusions into which imperfection will find its way; but it certainly is

not true that in thinking of unlimited power or goodness, or any other unlimited quality, we transcend the sphere of thought. When we have expressed in figures the greatest measurable idea of space that can be so expressed, what do we "symbolize," when we say that beyond that measured space there stretches a space that we can not measure, and to which there is of necessity no limit? Does a thinkable relation cease to exist, because one of the terms is immeasurable to us? As soon as we have formed an idea of a measurable portion of space, we necessarily have an idea of endless and immeasurable space; and in this deduction we have employed no "symbol" formed out of the materials which the measurable manifestations have given us. We have simply reached a conclusion that is inevitable. We are all the while thinking of space, whether it is definite space that we can measure, or indefinite space that we can not measure.

When the moral and intellectual qualities of men constitute one part of the phenomenal manifestations which we adopt as the basis of reasoning to the existence of God, we are in danger of assigning to that being attributes of character which would be far from perfection. Nearly all the religions that have existed, and of which we have much knowledge—perhaps all of them but one—have displayed more or less of this tendency. It is only necessary to instance the Hebrew Scriptures, for there are parts of that narrative in which the Deity is represented as actuated by something very much like human passions and motives, and these representations are among the hardest things to be reconciled with the idea that those books were inspired writings. Every one knows with what effect these passages of the Hebrew Scriptures are used by those who reject both the Old and the New Testaments as inspired books. But is philosophy therefore to shrink from the use of materials with which the world is filled, and which lead to the con-

ception of a being of infinite faculties and perfect goodness? Grant all that may be said of the stupid and fatal errors into which men have been led by likening the Deity to man : there remains a vast store-house of materials on which to reason to the existence of God, which philosophy can not afford to reject, which can be freed from the peril that has often attended their use, and which involve no "symbolizing" process of the kind which Mr. Spencer imagines.

Let us again translate Mr. Spencer's language, and endeavor to analyze his position. There is, he says, a law of thought, which requires and depends upon certain elements of thought. By "thought" he means a conceivable idea, or one which the mind can represent to itself. By the elements of thought he means, I suppose, the data which enable us to have an idea of a product. The process of reaching this product is supposed to be conducted according to a law which requires us to have the data or elements by which the process is to be conducted. For example, in the process of reaching an idea of definite space as a product of thought, we take certain data or elements, by conceiving of space as divided into successive portions to which we give the name of feet or miles. The product of thought is the number of feet or miles into which we divide the definite space of which we form an idea. In this process we have conformed to Mr. Spencer's law of thought, because we have data or elements by which to conduct the process and reach the product.

But now, says Mr. Spencer, when thought undertakes to have as its product the idea of endless space, it makes an effort to pass beyond its sphere ; the elements of thought fail, and therefore the law of thought fails ; the product is nothing but a dim symbol of a product ; the process becomes nothing but a dim symbol of a process ; and no predicament, that is, no fact, is here inferable from the

law of thought as a fact or predicament that can be asserted. But what, in the case supposed, is the fact or predicament that is asserted, when we speak or think of endless space, or of space that transcends all our powers of measurement? Is it correct to say that the law of thought fails, because we can not express endless space in feet or miles? Is it true that we have only "symbolized" the product of endless space out of the data or elements of measurable space? Here it is necessary to inquire what the learned philosopher means by "symbolizing" a product or a process. I understand him to mean, in the case supposed, that whereas in reference to the idea or product of a measurable space we have certain data or elements out of which to form that idea, when we undertake to think of endless space we transfer the notion of a measurable space to that of which no measure can be predicated, and therefore we can have no conception of endless space, but only a "formless consciousness of the inscrutable." Let us see if this is sound.

Take as a convenient idea of a measurable space the 92,000,000 miles from the earth to the sun, and lay it down on paper. If, after having measured this space, we could transport ourselves to the sun, we could extend the line in the same direction beyond the sun, by laying down a further measurement of 92,000,000 miles from the sun to any object that we could observe beyond the sun. This process we could repeat indefinitely and forever, if we could be successively removed to the different stages at each point of departure. But when an aggregate of such multiplied measurements had been reached greater than could be expressed in figures, we should still have the intellectual power of thinking of an extension of space indefinitely beyond that which we have measured. Nothing would have failed us but the power of expressing in figures the endless extent of space which lies beyond the utmost limit that we can so express.

It is precisely here, as I suppose, that Mr. Spencer's "symbolizing process" and his "symbolized product" come in. We have taken as the elements of thought the idea of successive measurements of space ; and the law of thought permits us to have as a definite product whatever extent of space can be marked off by such successive measurements. But when we undertake to have, as the product of thought, a consciousness, or conception, of endless space, we have merely used the idea of a definite space as a "symbol," or *simulacrum*, of that which is without form, and is only a "formless consciousness of the inscrutable"—whatever that means.

Let us see what has happened. The power of measuring, or describing in form, a definite extent of space, has given us an idea of space. The product of our thought is extension between two given points. Such extensions must be capable of indefinite multiplication, although we can not express in figures an indefinite multiplicand. The product is then something beyond what we can express in a definite form ; but is it beyond the sphere of thought ? What is it ? It is an idea which we deduce by a strict process of reasoning, and to which we do not need to give and can not give expression in figures. The process of reasoning is this : Measurement has given us an idea of space ; our faculty of applying measurement is limited ; but our faculty of conceiving of space through which we could go on forever multiplying such measurements, if we had the means, is certainly a faculty of which all men are conscious who are accustomed to analyze the processes of thought. In this process we may reach that which in one sense is "inscrutable." It is inscrutable, inasmuch as we can not understand how eternity of space or time came to exist. Our experience of phenomena enables us to have an idea of space and time, and from the fact that we have measured off portions of space or time, we deduce the fact that there

must be an eternity of both. It is immaterial whether we call this a "symbolizing" process, or call it something else. The product is an idea at which we arrive by a strict process of reasoning. Eternity of space or time is an inscrutable idea, when we attempt to inquire how it came to be. That it exists, is an idea from which the human mind can not escape, and which it reaches by a perfectly sound deduction. We are all the while thinking of space or time, whether we are thinking of that which is measurable, or of that which is immeasurable.

I now come to a passage in Mr. Spencer's recent article which it is necessary to attempt to explain to the unlearned reader, and to bring it, if possible, within the reach of ordinary minds. This passage, which follows in his recent article immediately after his quotation from his "Essays," is the following :

Thus, then, criticisms like this of Mr. Martineau, often recurring in one shape or other, and now again made by Mr. Harrison, do not show the invalidity of my argument, but once more show the imbecility of human intelligence when brought to bear on the ultimate question. Phenomenon without noumenon is unthinkable; and yet noumenon can not be thought of in the true sense of thinking. We are at once obliged to be conscious of a reality behind appearance, and yet can neither bring this consciousness of reality into any shape, nor can bring into any shape its connection with appearance. The forms of our thought, molded on experience of phenomena, as well as the connotations of our words formed to express the relations of phenomena, involve us in contradictions when we try to think of that which is beyond phenomena; and yet the existence of that which is beyond phenomena is a necessary datum alike of our thoughts and our words. We have no choice but to accept a formless consciousness of the inscrutable.

Some definitions must now be given. The word "phenomenon" has become naturalized in our English tongue. Derived as a noun from the Greek verb *φαίνωμαι*, *to appear*, it means anything visible; whatever is presented to

the eye by observation or experiment, or what is discovered to exist ; as the phenomena of the natural world, the phenomena of the heavenly bodies, of terrestrial substances, the phenomena of heat and color.* In this application the word denotes what appears to us, or what we discover by our senses. It is also used, in the plural, more loosely, to denote occurrences or things which we observe to happen ; as when, speaking of physical occurrences, we mean physical facts the happening of which we observe. Moral phenomena, on the other hand, are the appearances exhibited by the action of mind.

The word *noumenon* has not become naturalized in our language, and did not exist in Greek.† It can convey no intelligible meaning to common readers without tracing its derivation, and when it is analyzed we can attribute to it no meaning but a purely arbitrary one, even if we can arrive at that arbitrary signification. In fact, it is a word made by and for the school of Kant. Its first syllable is the Greek noun νοῦς or νόος, which corresponds to our English word *thought* or *intelligence*. The Greek verb νοέω, *to think*, was primarily used as *I perceive* ; the act of the mind in seeing. This idea was distinct from εἶδω, which conveyed the plain meaning of *I see*. But so subtile were the Greeks in their use of words, that εἶδω was sometimes used specifically to mean *to see with the mind's eye*, or, as we sometimes say, *to realize*, or to have a mental perception of. In the Greek use of the two words νοέω and εἶδω, no distinction was made between *phenomenon* and

* Webster's Dictionary, "Phenomenon."

† Our other American lexicographer, Worcester, who was pretty strict in regard to the words which he admitted into the English language, gives the word "noumenon," but he was careful to designate its arbitrary use. His definition is this :

"Noumenon, *n.* [Gr. νοῦς, the mind.] In the philosophy of Kant, an object in itself, not relatively to us ; opposed to *phenomenon*. *Fleming.*"

noumenon. To a cultivated Greek, *phenomenon* would mean something perceived, and *noumenon*, if he had possessed the word, would have had the same meaning. He would have used the two words interchangeably, to express either sight by the visual organs or mental perception. Mr. Spencer uses them as if they meant different things, as if *phenomenon* were something different from *noumenon*. But *noumenon*, according to its derivation (for it is coined as the participle of νοέω), means a thing, subject, or object, *perceived by the mind*. The root idea is mind-action, the verb νοέω meaning to do what the mind does in apprehending a subject or object. So that the derivation of *noumenon* does not help us to understand the Kantian or Spencian use of the word.

As this use of the word is, then, purely arbitrary, we must try to understand, as well as we can, what this arbitrary meaning is. As well as I can fathom it, in contrast with *phenomenon*, the meaning is that *phenomenon* is something that we see, and *noumenon* is the ghost or double of what we see. We see a thing with our eyes; but our mind does not see it—it perceives its ghostly double. This is *noumenon*.

Penetrating, or trying to penetrate, a little further into Mr. Spencer's meaning, it would seem that when he says that *phenomenon* without *noumenon* is unthinkable, he means that, although we can see a thing with our corporeal eye, we can not think of it without the mental act of seeing its image with the mind's eye; and then he adds that *noumenon* can not be thought of in the true sense of thinking, because *noumenon* is an abstraction or a mere ghost of a subject or an object.

What is all this but a kind of play upon words? We are so constituted that the impressions which a thing external to us produces upon our nerves of perception are instantly transmitted to the brain, and the mind has an in-

stantaneous perception of that object. The phenomenon which we see with our eyes, or become sensible of by touch, thus becomes a thing perceived by the mind, and when we think of it we do not think of its ghost, but we think of the thing itself. Did Laura Bridgman, who had neither eye-sight nor hearing nor speech, but who acquired all her ideas of external objects by the sense of touch, conceive of a round or a square, a rough or a smooth surface, by contemplating the ghost or double of what she touched? And had she no thinking in the true sense of thinking, because the double, or *imago* of the thing which she touched—the so-called *noumenon*—was at once necessary to her mental perception, and yet could not be thought of without seeing the object by the corporeal eye? She had no corporeal eye in which there was any vision. All her mental perceptions of external objects were acquired by the sense of touch alone; and we may well believe that she did not need the supposed *noumenon* to give her an idea of *phenomenon*. She perceived many phenomena by the simple transmission to her brain, along her nerves of touch, of the impressions produced upon them by external objects; and there is every reason to believe that many of her perceptions were as accurate and true as those which we derive from all our senses. We may now dismiss Mr. Spencer's distinction between *phenomenon* and *noumenon* as a distinction quite needless for the elucidation of what takes place in thinking of that which is behind appearance, and may proceed with the discussion of what remains of the passage above quoted.

At the risk of wearying by repetition, I will again resort to the illustration before employed, and will again describe how we reach the conception, for example, of endless space. According to Mr. Spencer, space, or extension, as a thinkable idea, or a subject of thought, is confined to a measurable extent of space. This is the phenomenon, or appear-

ance. All our forms of thought are, it is said, molded on our experience of phenomena that are measurable, or capable of being definitely described; and the connotations of our words which express the relations of phenomena relate to phenomena that we measure, or see, and can definitely describe. Therefore, we can not think of a reality that is behind appearance; can not bring the consciousness of such a reality into any shape, nor bring into any shape its connection with appearance.

If mankind are never to think of that which is behind appearance—can never think of a reality that is behind what they see—because their forms of thought are molded on experiences of phenomena that they see, and because the connotations of their words express the relations of those phenomena and no others, a vast domain of thinking is necessarily closed to them. This is not the experience of our minds. Every day of our lives we go on in search of that which is beyond appearance, and we find it. Take again, for example, the phenomena of a measurable portion of space or time. What appears to us gives an idea of space and time. We measure as great a portion of either as our forms of expression admit of our describing by definite terms, but we are immediately conscious of another reality, an endless extension or duration, because we are conscious that we have not exhausted and can not exhaust, by our measurements and descriptions, the whole possible existence of space or time. This new reality behind appearance is just as truly thinkable, just as true a consciousness, as is the measurable portion of time or space; for it is time or space of which we are constantly thinking, whether it is an extent or duration which we can describe in words, or whether we can only say that it is extent or duration without beginning and without end. Our minds are so constituted that the existence which is manifested to us by observable phenomena leads us to go behind the ap-

pearance in search of another reality beyond that which is manifested by the phenomena that we see. All that is inscrutable about this other reality that lies behind appearance is that we can not understand how it came to be, any more than we can understand how the phenomenon which we see and can measure and describe in a definite form came to exist. We do not bring, and do not need to bring, this other reality into connection with appearance. We first have an idea of space and time from observable and measurable phenomena. The reality of extension without limit, and duration without end, follows of necessity, by a process of thought which we can not escape.

But now it becomes needful to answer a further objection. I have said that we are all the while thinking of space, whether it is a measurable and limited or an immeasurable and illimitable space. Mr. Spencer, anticipating this obvious statement, admits that the form of relation between the two ideas, although "almost blank," preserves a certain qualitative character; that is, it is of the quality of space of which we think, whether it is measurable or immeasurable, and therefore it remains "a vaguely identifiable relation." But when, in place of one of the terms of the relation qualitatively the same as the other, we substitute an existence that can not be defined, and is therefore both quantitatively and qualitatively unrepresentable, the relation, he asserts, lapses entirely; one of the terms becomes wholly "unknowable."

I will not again repeat that extension or magnitude having no known limits is a thinkable term, because the subject of thought is the quality of extension or magnitude; quantity not being essential to the idea of extension or magnitude. But I will pass to the idea of an existence which can not be defined. I suppose that by an existence is meant a being. If we undertake to think of a being whose quality we do not know to be the same as the quality

of another being whom we do know, and the quantity of whose powers and faculties we can not measure, we propose, says Mr. Spencer, a term of impossible thought, because the law of thought can not be conformed to; the term can not be present to the mind, and no thinkable relation can be framed. Let this supposed difficulty be tested by a plain inquiry into that which we undertake to make the subject of thought when we think of a being who is said to be "unknowable."

"Agnosticism" is a doctrine which eludes a definite grasp. I have seen it defined by one of its most distinguished professors in this way: "Agnosticism is of the essence of science, whether ancient or modern. It simply means that a man shall not say he knows or believes that which he has no scientific grounds for professing to know or believe. . . . Agnosticism simply says that we know nothing of what may be beyond phenomena."* Mankind are apt to be rather practical in their habits of thinking: experience teaches them that there is a well-founded distinction between knowledge and belief, when it comes to be a question of asserting the one or the other.† They find, too, by experience that, in regard to what they speak of when they say that they know a thing, there is a distinction to be observed in respect to the means of knowledge. No one hesitates to say that he knows there was

* Prof. Huxley, who claims a sort of patent right or priority of invention in the term and doctrine "agnosticism."

† "There are some things I know and some things I believe," said the Syrian; "I know that I have a soul, and I believe that it is immortal." . . .

"I wish I could assure myself of the personality of the Creator," said Lothair; "I cling to that, but they say it is unphilosophical!" "In what sense," asked the Syrian, "is it more unphilosophical to believe in a personal God, omnipotent and omniscient, than in natural forces, unconscious and irresistible? Is it unphilosophical to combine power with intelligence?"—*Disraeli's "Lothair."*

such a man as Napoleon Bonaparte, although he never saw him, and although our knowledge of him is now derived from hearsay. But when we speak of knowing that a certain living person was at a certain spot on a certain day, we become immediately aware that in order to justify the assertion we or some one ought to have seen the person at the time and place, especially if anything important depends upon the assertion. There are a great many things that we say we know without scientific or other rigorous proof, and there are a great many other things which we do not say that we know without the kind of proof which is required. All our actions in life proceed upon this distinction, and we could not live in this world with any comfort if we did not act upon the assumption that we know things of which we have no scientific proof.

A very clever *jeu d'esprit* went the rounds of the periodical press some time ago, in which a well-born and highly educated young agnostic was represented as losing his birth-right, his *fiancée*, and all his prospects in life, because he demanded rigorous proof of everything that affected him. As he would not admit that he was the son of his own parents, without having better proof of it than their assertion, he was turned out-of-doors and disinherited. He would not accept the bloom on the cheek of his mistress as natural unless she gave him her word that she did not paint; and he would not admit that they loved each other without some better proof than their mutual feelings, about which they might be mistaken. The young lady indignantly dismissed him, but he consoled himself as a martyr to the truth of agnosticism. He became tutor to the son of a nobleman, whose belief in the boy's extraordinary talents, although justified by his progress in his studies, the tutor would not admit had the requisite proof. He propounded his denial of what the father had no proper grounds for maintaining, in an offensive way, and of course

he lost his place. He retired to a sort of agnostic brotherhood, glorying in his adhesion to truth. Some of his companions remained long enough in the brotherhood to find out that they were making fools of themselves, and at the first opportunity for acting on the ordinary grounds of knowing a fact without rigorous demonstration of it they left him in solitude, went into the world, and achieved success.

“A man shall not say he knows or believes that which he has no scientific grounds for professing to know or believe.” By “scientific grounds,” I presume is meant, in the case of a fact or occurrence, proper proof of the fact or occurrence. This varies with the nature of the thing which one professes to know. We constantly act upon proofs which do not amount to demonstration, and there could be no practical enjoyment of our lives and no safety if we did not. If a government were to receive information that a foreign army was on the border of the country and about to invade it, and the information fell short of being the testimony of eye-witnesses, what would be thought of the rulers if they were to fold their hands and say that they did not know the fact because they had no “scientific grounds for professing to know it”? On the other hand, if in a court of justice the question to be determined were the presence of an individual at a certain place and at a certain time, the established rules of evidence require certain kinds of proof of the fact.

Belief, however, is a conviction of something which may or may not require what are called “scientific grounds” before we can be permitted to profess that we believe. It depends upon the thing which we profess to believe, and upon the grounds on which we rest the belief, whether we have or have not safe and sufficient means of belief. Belief in the law of gravitation as a force operating throughout the universe is arrived at as a deduction from scientific

data. Belief in an existence beyond phenomena, in a being who is the producing agent of the phenomena, depends upon a great variety of grounds, some of which are scientific data and some of which are the elements of moral reasoning. We may not say that we "*know*" that God or any other supernatural being exists, but we may say that we "*believe*" in his existence. Here knowledge is one thing ; belief is another. Knowledge of the existence of God, like knowledge of the existence of any other being, might come to us through the testimony of a competent witness commissioned and authorized to inform us. Belief in the existence of God may be founded on many and various grounds without the direct testimony of the competent witness ; and these grounds may be perfectly satisfactory without being mathematical or scientific demonstration. It is a very remarkable fact that some of the most eminent of the school of agnosticism profess to have, and probably have, the most undoubting faith in the theory and actual occurrence of animal evolution, without any data, scientific or other, which can enable other men to arrive at the same conviction, whatever may be the character of the supposed proofs. They certainly have no grounds for professing to know that an evolution of species out of species has ever taken place ; and the grounds of their belief in the fact, whether denominated "scientific" or called something else, do not satisfy the rules of belief on which mankind must act, in accordance with their mental and moral constitutions ; and this belief does not rise any higher in the scale of moral probabilities than the belief in special creations, nor does it rise so high. But to return to Mr. Spencer.

If we did not act upon the process of thinking of another reality than that which appearance gives, act upon it fearlessly and by a mode of thinking to which we can safely trust ourselves, science would stand still, there would be no progress in physics, discoveries would cease, there

would be no improvement in morals, the world would remain stationary. What did Columbus do, when, going behind the phenomena that made the earth appear to be a flat surface, he thought of it as a sphere? Did he break the law of thought? He formed an idea of a reality behind appearance, not by employing the phenomenal manifestations to help him to the new conception, but by going away from them in search of a reality that lay behind them, and which they seemed to contradict. This conception of a sphere as the reality of the earth's condition proved to be the truth. He did not bring it, and did not need to bring it, into connection with appearance. He did not use, and did not need to use, the relations of the visible phenomena to help him to attain his conception of a spherical form of the earth. He contradicted them all.

Did all the moral lawgivers who have reformed the world break the law of thought, when, going behind the phenomena of human conduct, with their relations pointing to one idea of right and wrong, they conceived the idea of a new and a better rule of life? When it was said, in place of the old law of an eye for an eye and a tooth for a tooth, "Love your enemies and pray for those who persecute you"—when for the old rule of revenge there was substituted forgiveness of injuries—something was inculcated that contradicted all the appearances of the social phenomena, and that lay beyond them. Did the consciousness of this new reality become "a formless consciousness of the inscrutable"? What is there about it that is inscrutable? There is nothing inscrutable about it, or in the consciousness of it, excepting the mode in which the being who promulgated it came to exist. The idea of forgiveness is clearly within the compass of human thought and of human endeavor.

When we are in the process of making a new physical discovery, or of forming a new rule of moral action, we

work away from the materials which the phenomenal manifestations give us, to a new conception. We become conscious of a new reality behind appearance, and of an existence beyond the relations of the phenomena with which we have heretofore been familiar. It is to this striving after realities behind appearances—striving by an entirely true process of thinking—that the world owes its progress.

When the phenomenal manifestations of an intellectual and moral nature in man have given us the idea of an existence of an intellectual and moral being as a reality of which we become conscious, what is to prevent us from thinking of another intellectual and moral being as a reality, with faculties and powers immeasurably superior to ours? It is true that the phenomenal manifestations of man's intellectual and moral nature give us an idea of a being of very limited faculties and very imperfect moral qualities. But what is the "insoluble difficulty" in which we become involved, when we think of a being whose faculties are boundless, and whose moral nature is perfect? Does the "insoluble difficulty" consist in the impossibility of thinking of that which transcends all our powers of measurement? All that we have done, in the case of man, is to have a consciousness of a being whose phenomenal manifestations evince the existence of an intellectual and moral nature. He happens to be a being of very limited faculties and very imperfect moral characteristics. What prevents us from thinking, in the true sense of thinking, of another being, whose powers are without limit, and whose moral nature is perfect? Is it said that we can not bring into any shape the idea of unlimited power or of perfect goodness, or bring into any shape its connection with appearance, because all our ideas of power and goodness, all our forms of thought and expression, are molded on experiences of limited power and imperfect goodness? The truth is that we do not and need not strive to bring into

connection with appearance the idea of any quality which we conceive of as unlimited. What we derive from the phenomenal manifestations of human power and goodness is a consciousness of the qualities of power and goodness. It is perfectly correct thinking to reason that these qualities, whose phenomenal manifestations, in the case of man, show that in him they exist only in a limited degree, may exist in another being in unlimited perfection and without degree. Our minds are so constituted that we reason from the finite to the infinite, by observing that one class of phenomena evince the existence of the finite and another class of phenomena evince the existence of the infinite.

When, therefore, we pass from the phenomenal manifestations of human power and goodness, we come into the presence of other phenomena which we know could not be and were not produced by such a limited and imperfect being as man, but which must yet have had an author, a maker, an originator, a creator. We thus contemplate and investigate facts which show that the phenomena were the products of a skill, wisdom, and power that transcend all measurement. Is it said that the phenomena of nature, stupendous and varied and minute and wonderful as they are, evince only that a certain degree of power and wisdom was exerted in their production, even if their production is attributed to a being competent to bring them about? And therefore that the idea of a being of unlimited faculties and perfect goodness is as far as ever from our reach by any true process of thought? This assumption begs something that should not be taken for granted. It assumes that the production of the phenomena of nature does not evince unlimited power and perfect goodness; did not call for the existence of boundless faculties and inexhaustible benevolence; involved only a degree of such qualities, although a vastly superior degree to that possessed by us. The correctness of this assumption depends upon

the force of the evidence which nature affords of the character of the Deity. It is an assumption which has led to enormous errors—errors of conception and belief which impute to the Supreme Being only a superior degree of power and wisdom, greater than our own, but still limited and imperfect, liable to error, and acting in modes which distress us with contradictions and inconsistencies.

It may without rashness be asserted that the phenomena of the universe could not have been produced by a power and wisdom that were subject to any limitations. While all the researches of science, from the first beginnings of human observation to the present moment, show that in the production of the phenomena of nature there has been exerted a certain amount of power and wisdom, they also show that it is an amount which we can not measure ; that there is, moreover, a power and wisdom that have not been exhausted ; that the reserved force and skill and benevolence are without limit. For, in every successive new discovery that we make, in every new revelation of the power and goodness which our investigations bring forth, we continuously reach proofs of an endless capacity, an inexhaustible variety of methods and of products. So that, if we conceive of the whole human race, with all its accumulated knowledge, as ending at last in one individual possessed of all that has been learned on earth, and imagine him to be then translated to another state of existence, with all his faculties of observation and study preserved, and new fields of inquiry to be opened to him, his experience on earth would lead him to expect to find, and we must believe that in his new experience he will find, that the physical and the moral phenomena of the universe are an inexhaustible study ; that search and discovery must go on forever ; and that forever new revelations of power and goodness will be made to the perceptions whose training began in a very limited sphere. His experience in that limited sphere has taught

him that there was no end to the discoveries which were here partially within his reach. His experience in the new sphere will be a continuation of his experience in the old one; for there is a law by which we judge of the future by the past. This law is one of the conditions of our intellectual existence; an inevitable habit of our minds; imposed upon us by an inexorable but familiar authority. Our experience in this life has taught us that, in the investigation of the phenomena of nature that are open to our observation here, we have never reached the end of possible discovery; that every fresh discovery has evinced that there are still new things to be learned, new manifestations of power to be revealed, new products and new methods to be seen. However long we may suppose the human race to exist on earth and its researches to be prosecuted here, we must suppose an endless accumulation of knowledge hereafter, because the law which compels us to judge of the future by the past obliges us to accept as the fruition of the future that which has been the fruition of the past.*

Is there in this any violation of the true law of thought? Does the relation between our past experience and the experience which we forecast for the future fade into a dim symbol of a relation? On the contrary, both are equally capable of mental representation; for we are mentally so

* The practice of judging of the future by the past is sometimes treated as if it were a mere habit of the uncultivated and undisciplined part of mankind—a kind of mental weakness. Undoubtedly, our past experience is not always an infallible guide to what is to be our experience in the future. We often have to correct our past experience, by carefully separating the accidental from the essential; by more comprehensive analysis of the facts which constitute our former experience. But when we have full, comprehensive, and accurate views of that which has happened to us heretofore, our beliefs in what is to happen to us hereafter are not only attained by a safe process of reasoning, but that process is imposed upon us by a law of our mental constitution.

constituted that the consciousness of what has happened to us in the past—the unending succession of new discoveries, the constant accumulation of knowledge, which we have experienced here—gives us the conception of the same endless progress hereafter, compels us to believe in it, and enables us to grasp it as a product of true thought.

Mr. Spencer has much to say of “the imbecility of human intelligence when brought to bear on the ultimate question.” What is the ultimate question? The ultimate question with which science and philosophy are concerned is the existence of the Supreme Being. It is of the utmost consequence for us to understand wherein consists the imbecility of human intelligence when brought to bear upon this question of the existence of God. How does our imbecility manifest itself? What is the point beyond which thought can not go? We become conscious of the existence of the being called man, because, from the phenomena which we know that he produces by the exercise of his will and power, and which we know must have had an author and producer, we deduce an existence beyond the phenomena, an actor in their production. What more, or what that is different, do we do or undertake to do, when, from the phenomena of nature which we know that man did not produce, we think of another existence beyond the phenomena? In both cases, we study the phenomena by our senses and powers of observation; in both cases we reason that there is an actor who produces the phenomena; yet the existence of the actor who produces the phenomena is inscrutable in the case of the Deity in the same sense and for the same reason that it is inscrutable in the case of man. How the human mind came to exist, by what process it was made to exist, by what means it was created, what was the genesis of the human intellect, is just as inscrutable, no more and no less so, as the mode in which the Deity came to exist. In both cases the existence of a being is what we

think of ; and when we think of either being we think of that which is beyond phenomena but which we deduce from phenomena. In neither case do we "accept a formless consciousness of the inscrutable"; for what we accept is the consciousness of a being, and it is not a consciousness of the mode in which he came to exist. The latter consciousness is the inscrutable problem. The existence is what we think of, and we think of it by a perfectly true process of thought, deducing it from the simple truth that the phenomena must have had an actor in their production. We do not undertake to think of the process by which man was created, or of the mode in which that other existence came to be without beginning and without end.

I have thus discriminated between what we do and what we do not think of, when we think of an existence beyond phenomena, but which we deduce from phenomena. This is a most necessary discrimination ; for, in thinking of the existence, we do not try to think how it came to be an existence. We think only of the existence ; and we deduce it from our observation and study of phenomena, which teach us that they must have had an actor, an author, a producer, and that they did not produce or create themselves.

It remains for me to advert to Mr. Spencer's theory of the origin of the religious consciousness, or the origin of the idea of supernatural beings, and hence of one highest supernatural being. This is his ghost-theory. He has recently told us that in his "Descriptive Sociology"—a work commenced in 1867, and which preceded his "Principles of Sociology" (written in 1874)—he caused to be gathered adequate materials for generalization, consisting of a great number of excerpts from the writings of travelers and historians who have given accounts of the religious beliefs of the uncivilized races. He numbers 697 of these extracts which refer to the ghost-theory, and only 87 which

refer to fetichism. This great ratio of eight to one he considers overwhelming proof that the ghost-theory, as opposed to fetichism, is sustained by the beliefs of a vast majority of the uncivilized races. What if it is? What is the ghost-theory, and what is fetichism, as the chief source and origin of religion? Mr. Spencer, in his recent article, explains fetichism as most persons understand it, namely, the worship of inanimate objects, or belief in their supernatural powers. The ghost-theory, which his 697 extracts illustrate, is "the belief in a wandering double, which goes away during sleep, or fainting, and deserts the body for a longer period at death; a double which can enter and possess other persons, causing disease, epilepsy, insanity, etc., which gives rise to ideas of spirits, demons, etc., and which originates propitiation and worship of ghosts."* Further on, he reiterates his ghost-theory as the origin of religious beliefs, and explains it thus:

Setting out with the statement that "unlike the ordinary consciousness, the religious consciousness is concerned with that which lies beyond the sphere of sense," I went on to show that the rise of this consciousness begins among primitive men with the belief in a double belonging to each individual, which, capable of wandering away from him during life, becomes his ghost or spirit after death; and that from this idea of a being eventually distinguished as supernatural, there develop, in course of time, the ideas of supernatural beings of all orders up to the highest. Mr. Harrison has alleged that the primitive religion is not belief in and propitiation of the ghost, but is worship of "physical objects treated frankly as physical objects" (p. 498). That he has disproved the one view and proved the other, no one will, I think, assert. Contrariwise, he has given occasion for me to cite weighty authorities against him.

Next it was contended that in the assemblage of supernatural beings thus originating in each tribe, some, derived from chiefs, were superior to others; and that, as the compounding and recomounding of tribes gave origin to societies having social grades and

* "Nineteenth Century" for November, 1884, p. 827.

rulers of different orders, there resulted that conception of a hierarchy of ghosts or gods which polytheism shows us. Further it was argued that while, with the growth of civilization and knowledge, the minor supernatural agents became merged in the major supernatural agent, this single great supernatural agent, gradually losing the anthropomorphic attributes at first ascribed, has come in our days to retain but few of them; and, eventually losing these, will then merge into a consciousness of an Omnipresent Power to which no attributes can be ascribed. This proposition has not been contested.

Without entering into any consideration of what Mr. Harrison has disproved or proved, as between fetichism and the ghost-theory, I will now ask why the beliefs of the uncivilized races, or of the primitive men, should be regarded as important evidence of the origin of beliefs among civilized and cultivated men? Is modern philosophy, in accounting for or justifying the belief in a Supreme Being which is held to-day by most of the cultivated and educated part of mankind, to assign its origin to the primitive and uncivilized men? Is the whole idea of a supernatural being to be regarded as traditionally handed down from our barbarian ancestors? Is there no other source from which we can derive that idea? Are we none of us capable of finding for ourselves rational grounds of belief in a supernatural agent, deducing his existence from a study of nature? Or must we trace this belief back through the ages until we arrive at an origin which we shall of course despise? What has philosophy to do now with "the primitive religion"? Is there nothing that science and reason and disciplined methods of thought and sound deduction can teach us? Are we to throw away all the proofs which nature spreads before us, and for the investigation of which we have accumulated so many facilities, and turn to the beliefs of uncivilized men? Are the conceptions of supernatural beings, to which a barbarian at-

tained, to be taken as the origin of the conception of a personal God to which an educated philosopher can now attain ? And because of the inadequate and childish superstitions of the past, and of their growth into a belief of one supreme supernatural agent—whatever that idea of him may have been—is the consciousness which we have of a personal God to be hereafter merged into a consciousness of an Omnipresent Power to which no attributes can be ascribed ?

It should seem that the mode in which philosophy, after it came to be cultivated by civilized thinkers and observers, freed itself first from fetichism and the ghost-theory and all the beliefs of polytheism, next from physical agents as the causes of all phenomena, and finally attained an independent conception of a First Cause as a supreme personal intelligence and power, is worthy of some consideration.

In the first chapter of this work, borrowing from the English scholar and critic, Mr. Grote, I have given a condensed account of some of the systems of Greek philosophy which began in the first half of the sixth century before Christ, and extended down to Plato, whose life was embraced in 427–347 of the ante-Christian era. About 150 B. C., the Greek philosophy, and especially the speculations of Plato, encountered at Alexandria the monotheism of the Hellenizing Jews.* This history of Greek philosophy, as developed by Mr. Grote, shows that the struggle against polytheistic agencies, as the causes of natural phenomena, began with efforts to find purely physical agencies ; that this struggle, in spite of the surrounding beliefs in a multitude of supernatural beings of different orders, was long continued, and gave rise to a most remarkable variety of scientific explanations ; that it passed through an extraordinary number of physical theories, until at length in Plato

* Grote's "Plato," iii, pp. 284, 285.

there was developed the idea of a distinct personal constructive actor, the Demiurgus, a being to whom, whether intended by Plato as a philosophical myth, or as an entity in which he had something of faith or conviction, he assigned the formation of his Kosmos. With characteristic acumen, the English commentator points out Plato's skill in eluding the possible charge of infidelity to the established religion of Athens, while he at the same time propounded the existence of a personal First Cause that was in a striking degree inconsistent with the popular faith. The whole course of this history of Greek speculation evinces that from an early period the Greek philosophers were utter skeptics in regard to the popular religion and the poetic traditions; that they not only did not derive anything from the primitive religion, from fetichism, from the ghost-beliefs of their barbarian ancestors—if their ancestors had such beliefs—or from their heroic ages, or from the multitudinous gods of the popular theology and the popular worship, or from the old poetical imagery, but that they strove to get away from all these sources, and to construct theories of the universe that would explain the ultimate cause or causes in a very different manner. The earliest Greek speculators got no further in their theories than the construction of systems of physical agencies, or agencies that stood to them in the quality of physical actors. Plato, on the other hand, resorted to the conception of a supreme personal actor.

Mr. Grote has further mentioned a very striking fact, which is, that before the Christian era, the Demiurgus of Plato was received by the Hellenizing Jews at Alexandria as a conception kindred to the God of Moses. His statement, in substance the same as that previously made by a Continental critic, Gfrörer, is so interesting and important that I quote his words: "But though the idea of a pre-kosmic Demiurgus found little favor among the Grecian

schools of philosophy before the Christian era, it was greatly welcomed among the Hellenizing Jews at Alexandria, from Aristobulus (about B. c. 150) down to Philo. It formed the suitable point of conjunction between Hellenic and Judaic speculation. The marked distinction drawn by Plato between the Demiurgus, and the constructed or generated Kosmos, with its in-dwelling gods, provided a suitable place for the Supreme God of the Jews, degrading the pagan gods by comparison. The 'Timæus' was compared with the book of Genesis, from which it was even affirmed that Plato had copied. He received the denomination of the Atticising Moses—Moses writing in Attic Greek. It was thus that the Platonic 'Timæus' became the medium of transition from the polytheistic theology, which served as philosophy among the early ages of Greece, to the omnipotent monotheism to which philosophy became subordinated after the Christian era." *

Perhaps there is no more remarkable fact than this in the whole history of philosophical speculation. Possibly Mr. Spencer would say that it adds another proof to his ghost-theory. But the important fact is that Plato's Demiurgus partakes in no degree of the ghost idea, and, instead of being a modification of that idea, is an original and perfectly independent conception. The Demiurgus of Plato is not a chief spirit evolved in imagination out of a hierarchy of spirits. He is himself the originator and fashioner of the gods, of whom he makes use as ministers in the formation of the bodies of the primitive men, after he has himself formed the souls which are to inhabit them for a season.

It appears, by Mr. Grote's citations from Gfrörer, that the latter had previously noted what Aristobulus maintained one hundred and fifty years earlier than Philo,

* Grote's "Plato," iii, p. 285, and notes.

namely, that “not only the oldest Grecian poets, Homer, Hesiod, Orpheus, etc., but also the most celebrated thinkers, especially Plato, had acquired all their wisdom from a very old translation of the Pentateuch.” Neither of these modern critics appears to have accepted the assertion of Aristobulus, and its intrinsic improbability is very great. Certainly the internal evidence of the “Timæus” negatives the assumption that Plato had seen the Pentateuch, for his Demiurgus is not the God of Moses, although it was very natural for the Alexandrian Jews to think they recognized a resemblance. Mr. Grote, moreover, seems to put this matter beyond doubt, for he says that the Platonic “Timæus” *became the medium of transition* from the polytheism of early Greece to the monotheism of the Christian era. This implies very clearly that Mr. Grote did not consider the Demiurgus of Plato to be either derived from the polytheism of the early Grecian ages, on the one hand, or from the Mosaic Jehovah, on the other hand, but that he considered it a conception which stood between them. The point of resemblance is in the idea of a divine and supreme personal actor in the production of phenomena.

It does not seem, therefore, that a philosopher at the present day is confined to the source of the primitive religion, be that source what it may. The primitive religion, whether its origin was fetichism or a belief in ghosts, has imposed no shackles upon our minds. The beliefs of the primitive men may have originated as Mr. Spencer supposes, but the question for us—revelation being laid aside—is just what it was for Plato, the difference being that our means of investigation are superior to his. The grounds of our belief in a personal God are not the same as those on which the uncivilized races formed first the idea of a wandering double emanating from the human body, then conceived of spirits or ghosts, next of different orders of spirits or ghosts, and finally of a chief and supreme spirit.

Our materials for sound deduction are not the same as those of the primitive races of mankind, or of the uncivilized tribes of the present day. I have before remarked that the intellectual effort of a savage in striving for the idea of a deity is the same kind of effort as that of the civilized and educated man ; but that the difference between them is in the growth and activity of the reasoning power, and in the materials on which it is exercised. While our barbarian predecessors lived in an age of ignorance, we live in an age of knowledge. We are surrounded by extraordinary discoveries, and are possessed of the means of still further research. They had almost no means for investigating physical phenomena. We are, or ought to be, disciplined reasoners. They, on the contrary, while able to reason correctly on a very few subjects, could not reason correctly on all subjects. We are, or ought to be, capable of subjecting the materials which the phenomena of nature spread before us, to sound processes of thought and to logical deductions. We are, or ought to be, capable of discriminating between that which is really inscrutable and that which is not so. We are, or ought to be, able to know when we are within the bounds of possible thought, and when we transcend them. We are, or ought to be, able to see that the existence of phenomena necessarily implies a causing power ; that when the phenomena are such as we know that man produces, the idea of an intelligent personal actor is both a legitimate deduction and a perfectly appreciable subject of thought. Are we not entitled to apply the same reasoning to the phenomena of nature which we know that man did not produce ? And when we so reason, do we borrow anything whatever from the primitive idea of ghosts or spirits, whether they are supposed to have first emanated from human bodies, or to reside in inanimate objects ?

There are two distinct values to be assigned to the re-

searches of science. One of them consists in the practical improvement of the material condition of society ; the lessening of physical evil, the increase of physical good ; the advancement of our power over matter. In an age intensely devoted to this materialistic improvement, there will be a great accumulation of physical knowledge. At the same time there are accumulating in the same ratio new materials for philosophical speculation concerning the causes of the phenomena that are investigated. The specialists who carry on the investigations may not always be the best reasoners in the application of the new materials to the purpose of philosophical inquiry into the producing causes of the phenomena. But the other distinct value of their investigations consists in the accumulation of materials from which the philosopher can deduce the existence of an actor in the production of the phenomena. When, from these materials, constantly accumulating and constantly to be used in a uniform process of reasoning to which the human mind is both able and obliged to resort, the philosopher deduces the conception of a supreme, personal, intelligent being, he assigns to that being just those attributes which the phenomena of nature compel him to believe in, because if the attributes did not exist the phenomena of nature could not have become what they are. There can be no reason to suppose that as the materials increase, as the researches of science, for whatever purpose carried on, lead to greater and still greater accumulations of knowledge, the law of thought by which we deduce the idea of an actor in the production of phenomena will change, or that the logical necessity for conceiving, or the intellectual capacity to conceive of, the attributes of that actor will either diminish or fade away. An Omnipotent Power without attributes, or one to which no attributes can be assigned, is not likely to be the end of all philosophical speculation about the ultimate cause. Power without at-

tributes, power without a determining will, power without guidance, or purposes, or objects, is not a conception to which a well-trained intellect is now likely to attain ; and the greater the accumulation of physical knowledge becomes, the greater will be the necessity to such an intellect for recognizing attributes, and for assigning them to the power which is manifested by the phenomena.

According to Mr. Spencer, the process by which mankind are ultimately to lose the consciousness of a personal Deity is the following : Anthropomorphic attributes were at first ascribed to the single great supernatural agent of whom the primitive men conceived. But in our days, the idea of such a supreme supernatural agent has come to retain but a few of these attributes. These few will eventually be lost, and there will be nothing left but a consciousness of an Omnipotent Power to which no attributes can be ascribed. The probability of this result depends upon the necessity for ascribing what are called anthropomorphic attributes to the Supreme Being ; or, in other words, it depends upon the inquiry whether, in order to ascribe to the Supreme Being any attributes at all, we are necessarily confined to those which are anthropomorphic.

“ Anthropomorphism,” a term compounded from the Greek *ἄνθρωπος*, man, and *μορφή*, form, has come to signify the representation of the Deity under a human form, or with human attributes and affections. It is therefore important to know what we in fact do, when reasoning on the phenomena of nature, we reach the conclusion that they must have had an author or producer, and then ascribe to him certain attributes. The fact that the ancient religious beliefs ascribed to the Supreme Being grossly anthropomorphic attributes, is unimportant. So is the fact that the anthropomorphic attributes have been slowly diminishing in the conceptions of the reasoning and cultivated part of mankind. The really important question is whether

there can be no conception of a Supreme Being without ascribing to him attributes which liken him to man ; or whether, when the anthropomorphic attributes are lost, the idea of a personal God will be lost.

The essential character of any anthropomorphic or human attribute—power for example, or wisdom, or goodness—is that it is limited, imperfect, and liable to error. But when we conceive of these qualities as existing in absolute perfection and boundless capacity, while we retain the idea that they are personal qualities, we in fact divest them of their anthropomorphic or human character. It is a contradiction in terms to say that an imperfect human capacity is the same attribute as a divine and unlimited capacity. The difficulty with the ancient religious beliefs, the whole error of anthropomorphism, was that the conceptions stopped short of the idea of unlimited power, wisdom, and benevolence. The attributes ascribed to the Deity likened him to man in form, character, powers, dispositions, passions. He was an exaggerated human being, with vastly more power, more skill, more wisdom, but still with the same kind of power, skill, and wisdom, actuated by like motives and governed by like passions. Now the truth is, that the difference between a limited and imperfect attribute of character and one that is boundless—power, for example—is more than a difference of degree. It is a difference in kind ; for while in both cases we conceive of a personal capacity to act and a will to guide the act, in the one case we are thinking of that which is inferior, limited, and feeble, and in the other case we are thinking of that which knows no limitations and is absolutely inexhaustible. It is not true, therefore, that there can be no conception of a Supreme Being without ascribing to him human attributes. When we reason from phenomena to the conclusion that they must have had an author—when we reach the conviction that phenomena must have had a cause, that there

must have been an actor, a process, and a product—we have to deal with two classes of phenomena. One is the class in which we know, from the observations of our senses and our experience, that the author and actor was man. It becomes verified to us with irresistible certainty that the phenomena of human society were produced by an actor, and that that actor was man; a personal agent with a limited and imperfect power. When we turn to the phenomena of nature which we know that man did not produce, we are led by the same irresistible logical sequence of thought to the conviction that these phenomena must have been caused to exist, for human reason revolts at the idea that the phenomena which exist were not caused to exist. We come immediately to perceive that the phenomena of nature are of such a character that the power which has produced them must not only have been superhuman, but it must have been absolutely boundless. At the moment we depart from the investigation of phenomena which belong in the department of human efforts, and come to the phenomena which belong in the department of nature alone, while the necessity for a personal actor continues, the character and capacities of the actor become entirely changed. We see that the phenomena of nature required for their production power without limitation, skill incapable of error, benevolence that was inexhaustible. We thus pass entirely away from anthropomorphic attributes, to the conception of attributes that are not human. We may go on to divest the idea of a Supreme Being of all the attributes that can appropriately be classed as anthropomorphic, and there will still remain the conception of a Supreme Being to whom we not only may but must ascribe attributes that are forced upon our convictions, not because some of them belong in an inferior degree to man, but because all of them are of such a character that if they did not exist in boundless perfection the phenomena of nature could not have existed.

Among the origins which have been assigned to religious beliefs, there is one remarkable hypothesis which may be contrasted with the ghost-theory, and which, so far as the beliefs of cultivated men at the present day are concerned, is about as important as the origin of the belief in ghosts, or as fetichism. It seems that some of the Greek philosophers and historians, entirely regardless of the ghost-theory as the origin of beliefs in supernatural beings, considered that they were fictions invented by the first lawgivers, and promulgated by them for useful purposes. Belief in the gods was thus imposed by the authority of those who organized society and dictated what men were to believe in order to exercise a useful restraint. Plato himself regarded this as the origin of what the communities around him believed respecting the attributes and acts of the gods; the matters believed being fictions prescribed by the lawgivers. In his "Republic," in which he sketches the entire political, social, ethical, and religious constitution of an ideal city, assuming it to be planned and put in operation by an absolute and unlimited authority, he laid it down as essential for the lawgiver to determine what the fictions were to be in which his own community were to be required to believe. Some fictions there must be; for in the community there would be originally nothing but a vague emotional tendency to belief in supernatural beings, and this tendency must be availed of by some positive mythical inventions which it was for the lawgiver to produce and the citizens to accept. Such fictions were the accredited stories about the gods and heroes, which formed the religious beliefs among Plato's contemporaries, and were everywhere embodied in the works of poets, painters, and sculptors, and in the religious ceremonies. But the ancient fictions were, in Plato's opinion, bad, inasmuch as they gave wrong ethical ideas of the characters of the gods. They did not rest upon traditionary evidence, or divine

inspiration, being merely pious frauds, constructed by authority and for an orthodox purpose. But they did not fulfill the purpose as well as they should have done. Accordingly, Plato directs in his "Republic" the coinage of a new body of legends, for which he claims no character of veracity, but which will be more in harmony with what he conceives to be the true characters of the gods, and will produce a more salutary ethical effect upon those who are to be the efficient rulers of the commonwealth after it is founded. As the founder of his ideal city, he claims and exercises an exclusive monopoly of coining and circulating such fictions, and they are to be absolutely accepted by those who are to constitute its rulers, and who are to promulgate and teach them to the community, as the physician administers wholesome remedies. To prevent the circulation of dissenting narratives, he establishes a peremptory censorship. There is thus no question of absolute truth or absolute falsehood. That is true which is stamped at the mint of the lawgiver, and that is false which he interdicts.*

Nowhere has orthodoxy been rested more distinctly upon the basis of absolute human authority—authority acting upon the highest motives of the public good, for the most salutary purposes, but without claiming anything in the nature of divine inspiration, or even pretending to any other truth than conformity to preconceived ideas of the characters of the gods. As evidence of what Plato regarded as the origin of the religious beliefs which were held by his contemporaries, his "Republic" is an important testimony; for he assigns almost nothing to mankind in general, but an emotional tendency to believe in invisible quasi-human agents, of whom they had no definite conceptions, and at the same time they were entirely ignorant

* Grote's "Plato," iii, p. 181 *et seq.*

of recorded history, past and present. They needed distinct legendary fictions and invented narratives ; these were furnished to them by those who could coin them, and were accepted upon the authority of those who promulgated them. Those who first embodied the fictions as narratives were the oldest poets ; in progress of time the authority which dictated belief in them came to be the state. Plato rejected the fictions of the state, and in his "Republic" proposed to substitute fictions of his own. The testimony of Plato, therefore, in respect to the origin of religious beliefs in the early ages of Greece is decidedly against the ghost-theory, whatever support may be found for that theory in the beliefs of the uncivilized races of our own day, or in the beliefs of other nations of antiquity. But neither the ghost-theory, as the origin of beliefs in supernatural beings, nor the origin of such beliefs in the will of the lawgiver, which Plato clearly held in his "Republic" to be the foundation of orthodoxy, is any test or measure of what philosophy may attain to as a rational conception at the present day.*

* The contradictions between Plato's ideas of the origin of beliefs in the gods, as given in his various writings, are of course unimportant in reference to the present discussion. In the "Timæus," as Mr. Grote has pointed out, Plato "accepts the received genealogy of the gods, upon the authority of the sons and early descendants of the gods. These sons must have known their own fathers ; we ought, therefore, to 'follow the law and believe them,' though they spoke without either probable or demonstrative proof. . . . That which Plato here enjoins to be believed is the genealogy of Hesiod and other poets, though he does not expressly name the poets." (Grote, iii, p. 189, note.) In other words, the sons of the gods are authoritative witnesses to their genealogy, whose *ipsi diximus* must be believed. On the other hand, in his "Republic" and "Leges," Plato rejects the authority of those witnesses, and boldly proclaims that their legends are fictions, which must be displaced by better fictions, more consonant to a true ethical conception of the characters of the gods. It is the province of the lawgiver to supply these better legends, but they are all the while fictions, although the multitude do not know that they are so. Mr. Grote

I propose, therefore, to imagine a man of mature years, without any religious prepossessions whatever, a perfectly independent thinker, furnished with the knowledge that is now within the easy reach of human acquisition, capable of correct reasoning, and with no bias to any kind of belief. It is only necessary to personify in one individual the intellectual capacity of the cultivated and educated part of mankind, but without the religious ideas instilled into them by education, in order to have a valuable witness to the mental processes and results which can be followed and attained by a right employment of our faculties. And, the better to exhibit the processes and results, I propose to let this imaginary person discuss in the form of dialogue, in which another imaginary interlocutor shall be a modern disciple of the evolution school, whatever topics would be likely to come into debate between such persons.

accounts for these and other discrepancies in the writings of Plato by explaining that his different dialogues are not interdependent productions, but separate disquisitions. (See his admirable and critical examination of the Platonic canon, in Chapters IV, V, VI, of his first volume.)

CHAPTER VIII.

The existence, attributes, and methods of God deducible from the phenomena of Nature—Origin of the solar system.

IN all that has been said in the preceding chapters respecting the two hypotheses of special creation and evolution, the existence and attributes of the Supreme Being have been assumed. The question of the existence and attributes of God has been reserved for discussion as an independent inquiry ; and this inquiry it is now proposed to make, without any reference to the teachings of revealed religion, or to the traditionary beliefs of mankind. The simple idea of God, which I suppose to be capable of being reached as a philosophical deduction from the phenomena of the universe, embraces the conception of a Supreme Being existing from and through all eternity, and possessed of the attributes of infinite power and goodness, boundless, that is to say in faculties, incapable of error, and of supreme beneficence. While this idea of God corresponds with that which has been held from an early period under more or less of the influence exerted by teachings which have been accepted as inspired, or as authorized by the Deity himself, the question here to be considered is whether the same idea of God is a rationally philosophical deduction from the phenomena of the universe without the aid of revelation.

In order to conduct this inquiry so as to exclude all influence of traditionary beliefs derived from sources believed to have been inspired, or from any authority whatever, let

us suppose a man to have been born into this world in the full maturity of average human faculties, as they are found in well-disciplined intellects of the present age, but without any inculcated ideas on religious subjects. In the place of education commencing in infancy and carried on to the years of maturity, in the course of which more or less of dogmatic theology would have become incorporated almost with the texture of the mind, let us suppose that the mind of our inquirer is at first a total blank in respect to a belief in or conception of such a being as God, but that his intellectual powers are so well developed that he can reason soundly upon whatever comes within the reach of his observation or study. Let us further imagine him to be so situated that he can command at will the knowledge that science, as it now exists, could furnish to him, and that he is able to judge impartially any theories with which he meets. Such a person would be likely to deal rationally and independently with any question that might arise in the course of his investigations; and the fundamental question that would be likely to present itself to his mind would be, How came this universe and its countless phenomena to exist?

Stimulated by an eager curiosity, but careful to make his investigations with entire coolness of reasoning, let us suppose that our inquirer first turns his attention to the phenomena of the solar system, and to what astronomy can teach him in regard to its construction. He finds it to consist of—

1. The sun, a great central body giving forth light and heat.
2. A group of four interior planets : Mercury, Venus, the Earth, and Mars.
3. A group of small planets, called asteroids, revolving beyond the orbit of Mars, and numbering, according to the latest discoveries, about two hundred and twenty.

4. A group of four planets beyond the asteroids : Jupiter, Saturn, Uranus, and Neptune.

5. The satellites of the planets, of which there are twenty now known ; all but three of them belonging to the outer planets.

6. An intermediate number of bodies called comets and meteors, which revolve in very eccentric orbits.

This system of bodies, constituting a mechanism by itself, apart from what are called the fixed stars, is the first object in nature to which our inquirer directs his studies. Inasmuch as the comets and meteors move in very eccentric orbits, and are supposed to come into our system from the illimitable spaces beyond it, although in the case of the comets, or some of them, mathematical calculations enable astronomers to predict their return when they have passed out of the solar system, and inasmuch as the sun and the superior planets may be contemplated as a grand piece of mechanism, and as the greatest mechanical object in nature of whose construction and movements we have some accurate knowledge, we will suppose that our inquirer confines his attention to this part of the solar system, without adverting to the action of the bodies which are not always, as these are, within the range of the telescope.

One of the first things that would strike him would be the enormous range in the sizes, distances, and relative weights of these different bodies. He would learn, for example, that Neptune is eighty times as far from the sun as Mercury, and that Jupiter is several thousand times as heavy ; and he would observe that these differences in magnitude, distance from the sun, and weight of each mass, are carried through a range of proportions stupendously great. If he followed the best lights of modern astronomy, he would learn that what is known, or accepted as known, in regard to the operation of any law among these bodies, is that they are bound together by the law of universal gravi-

tation as a force to which all matter would be subjected when it should come to exist, in whatever forms it might be distributed ; secondly, that when the bodies now composing the solar system should come into existence, the system would not owe its proportions to the operation of the law of gravitation, but would be the result of a plan so shaped as to admit of its being governed by the law of gravitation after the system had been made, in such a manner as to produce regularity and certainty of movement and to prevent dislocation and disturbance. What the great modern telescopes have enabled astronomers to discover tends very strongly to show that the plan of the solar system, in respect to the relative distances, magnitudes, and revolutions of the different bodies around the sun, and their relations to that central body and to each other, are not the result of any antecedent law which gradually evolved this particular plan, but that the plan itself was primarily designed and executed as one on which the law of gravitation could operate uniformly, and so as to prevent any disturbance in the relations of the different bodies to each other.*

An illustration will help to make the meaning of this apparent. Let us suppose a human artificer to project the formation of a complex mechanism, in which different solid bodies would be made to revolve around a central body ; and let us imagine him to be situated outside of the earth's attraction, so that its attraction would not disturb him. He would then have to consider the law of gravitation only in reference to its operation among the different bodies of his machine ; and he would adjust their relative distances, weights, and orbits of revolution around the

* The reader will understand that I do not assert this to be what astronomers teach, but I maintain it to be a rational deduction from the facts which they furnish to us.

central body, so that the law of gravitation, instead of producing dislocation and disturbance, would bind the whole together in a fixed system of movement, by counteracting the centrifugal tendency of a revolving body to depart from its intended orbit, and at the same time relying on the effect of the two forces in preventing the revolving bodies from falling into the center or from rushing off into the endless realms of space.

This is what may well be supposed to have taken place in the formation of the solar system, for it is consistent with the law which must have preceded the existence of that system. We can not suppose that the law of gravitation was itself a mere result of the relative distances, magnitudes, and orbits of the different bodies. This supposition would make gravitation not a law, but a phenomenon. We do indeed arrive at the existence of the law of gravitation by observing the actions of the bodies which compose the solar system ; in other words, we discover the law that holds them together, by observing their actions. But we should entirely reverse the proper process of reasoning, if we were to conclude that the law of gravitation is a phenomenon resulting from an arrangement of certain bodies according to a certain plan. The discoveries of astronomy, on the contrary, should lead us to regard gravitation as a universal law, which existed before the existence of the bodies which have been subjected to it. This is the only way in which our inquirer could reason in regard to the formation of the solar system, whether he supposed its plan to have been a special creation, or to have been evolved out of a nebulous vapor by the operation of the laws of motion or any other laws. Reasoning upon the hypothesis that the law of gravitation existed before there were any bodies for it to operate upon, or, in other words, that it had become in some way an ordained or established principle by which all bodies would be governed, he would have the

means of understanding the adaptation of the solar system to be operated upon by the law which he had discovered.

He would next ask himself, How came this law of gravitation to exist? That it must have had an origin, must have proceeded from some lawgiver competent to make and enforce it, would be a conclusion to which he would be irresistibly led, for the very idea of a law implies that it is a command proceeding from an authority and power capable of ordaining and executing it. When it is said that a law is a rule of action ordained by a supreme power, which is perhaps the most familiar as it is the most exact definition, the idea of a command and of a power to enforce it is necessarily implied. This is just as true of a physical as it is of a moral law; of a law that is to govern matter as of a law that is to govern moral and accountable beings. Both proceed from a supreme authority and power, and both are commands. There is, however, one distinction between a moral law and a law of Nature, which relates to the mode in which we arrive at a knowledge of the law; a distinction which our inquirer would learn in the course of his investigations. We infer the existence of a law of Nature, or a law designed to operate upon matter, from the regularity and uniformity of certain physical phenomena. As the phenomena occur always in the same way we infer it to be an ordinance of Nature that they shall occur in that way. But the moral phenomena exhibited by the actions of men have not this regularity and uniformity. They are sometimes in accordance with and sometimes grossly variant from any supposed rule of moral action. We can not, therefore, deduce a moral law from our observation of the actions of the beings whom it was designed to govern, but we must discover it from the rules of right reason and from such information as has been given to us by whatever revelation may have come to us from another

source than our own minds. But this distinction between the modes of reaching a knowledge of physical and moral laws does not apply to the authority from which they have proceeded. Both of them being commands, or fixed rules of action, both must have had an enacting authority. We learn the one by observing the phenomena of Nature. We learn the other from reason and revelation.

To return now to the examination of the solar system, which our inquirer is supposed to be prosecuting. The study, which astronomy and its implements will have enabled him to make, has taught him the existence of the law of gravitation, and has led him to the conclusion that it must have had an enacting authority. Following out the operation of this law, through the stupendous spaces of the solar system, he would begin to form conclusions respecting the attributes of its author. He would see that the power must have been superhuman; in other words, that it must have immeasurably transcended anything that can be imagined of power wielded by a being of less than infinite capacities; for, although the space occupied by the solar system, from the central sun out to the orbit of the planet Neptune, is a measurable distance, the conception of the law of gravitation, and its execution, through such an enormous space and among such a complex system of bodies, evince a faculty in the lawgiver that must have been boundless in power and skill. The force of gravitation is found to exactly balance the centrifugal tendency of the bodies revolving around the sun, so that, when once set in motion around that center, they remain in their respective orbits and never fall into the sun or into each other. Our learner would thus see the nature of the adjustment required to produce such a result; and, even if he endeavored to follow out this balancing of forces no farther than to the extreme boundary of the solar system, he would see that the being, who could conceive and execute such a design on such a

scale, must have had supreme power and boundless intelligence. So that, by the study of the solar system, as its arrangements and movements are disclosed by astronomy, our inquirer would be naturally led to the conception of a lawgiver and artificer of infinite power and wisdom, ordaining the law of gravitation to operate against the centrifugal force, which would otherwise conduct out of its orbit a body revolving around a center, and then adjusting the relative distances, weights, and revolutions of the different bodies, so as to subject them to the operation of the great law that is to preserve them in fixed relations to each other.

If, next, our inquirer should go farther in his investigations of the solar system, and endeavor to satisfy himself concerning the mode in which the different bodies of this system came into existence in their respective positions, the history of astronomy would teach him that there has been a theory on this subject which fails to account for the existence of this system of bodies without the hypothesis of some special creation. This theory is what is called the nebular hypothesis. It supposes that the solar system was evolved out of a mass of fiery vapor, which filled the stellar spaces, and which became the bodies now observable by the telescope, and that they were finally swung into their respective places by the operation of the fixed laws of motion. But all that astronomers now undertake to say is that this hypothesis is a probably true account of the origin of the solar system, and not that it is an established scientific fact, or a fact supported by such proofs as those which show the existence of the laws of motion. The history of the nebular hypothesis, from the time of its first suggestion to the present day, shows that there are no satisfactory means of accounting for the method in which the supposed mass of fiery vapor became separated, consolidated, and formed into different bodies, and those bodies became ranged and located in their respective positions. The hypothesis that

these results were all produced by fixed laws working upon a mass of fiery vapor, is one that has been reasoned out in very different ways ; and this diversity of views is such that astronomers of the higher order do not undertake to say that opinions may not reasonably differ in regard to the principal question, namely, the question between the nebular hypothesis and the hypothesis of a special act or acts of creation.

Inasmuch, therefore, as scientific astronomy would present to our inquirer nothing but the nebular hypothesis to account for the production of the bodies of the solar system as they now exist, and as there are admitted difficulties in this hypothesis which may not be insurmountable but which have not been as yet by any means overcome, it can not be said that philosophers are warranted in assuming that all the phenomena of the solar system are to be explained by this theory. The hypothesis that the phenomena, or some part of them, have been produced by a cause operating in a different way, that is, by an act or acts of intentional and direct or special creation, is not excluded by the discoveries of the astronomer. Those discoveries lie in the domain of astronomy, and they do not exclude the hypothesis of a special creation of the solar system upon the plan on which we find it arranged. The latter hypothesis lies in the domain of philosophy. It is to be judged by the inquiry whether it is a rational explanation of phenomena, which astronomy does not show as an established scientific fact, or by proofs that ought to be deemed satisfactory, to have been produced by the method suggested by the nebular hypothesis.

The philosophic reasoning, which would conduct our inquirer to his conclusions, would begin for him with the existence of an omnipotent being, by whom the laws of matter and motion were established. This conception and belief he has attained from having discovered those laws,

which must have had an author. He would soon hear the scientist speak of "natural" and "supernatural" methods, and he would understand that by the former is meant the operation of certain fixed laws, and, by the latter, a mode of action in a different way. But he would also and easily understand that the power which could establish the laws of matter and motion, the operation of which the scientist calls the natural method, could equally act in another way, which the scientist calls the supernatural, but which, in the eye of philosophy, is just as competent to the Infinite Power as the method called natural. To state it in different words, but with the same meaning, that which the scientist calls the supernatural is to the philosopher just as conceivable and just as consistent with the idea of a supreme being as the order of what we call Nature ; for Nature is the phenomena that are open to our observation, and from which we deduce the probable method by which they have been brought about. It will never do to say that they could not have been produced by a cause operating differently from a system of fixed laws so long as we reason from the hypothesis of the existence and attributes of a Supreme Being. If we reason without that hypothesis, we may persuade ourselves of anything or of nothing.

This idea of a Supreme Being, possessed of the attributes of infinite power and wisdom, is one that our inquirer would have reached as a rational deduction from the operation of a law (gravitation) which must have had an author ; from the structure of a mechanism so designed as to be governed successfully by that law, and from the execution of the law through such enormous spaces that nothing short of infinite power and wisdom could have produced the result.

At this stage of his investigations, our inquirer encounters a modern scientist. I shall take the liberty of coining convenient names for these two interlocutors : call-

ing the one Sphereus, as representing the spirit of unprejudiced research in the formation of beliefs without the influence of previous teaching; and the other Kosmicos, as a representative of the dogmatic school of evolution and agnosticism.

Sphereus has imparted to his scientific friend the conclusions which he has thus far reached, concerning the existence and attributes of a supreme lawgiver and artificer, as deduced from the phenomena of the solar system. The discussion between them then proceeds as follows:

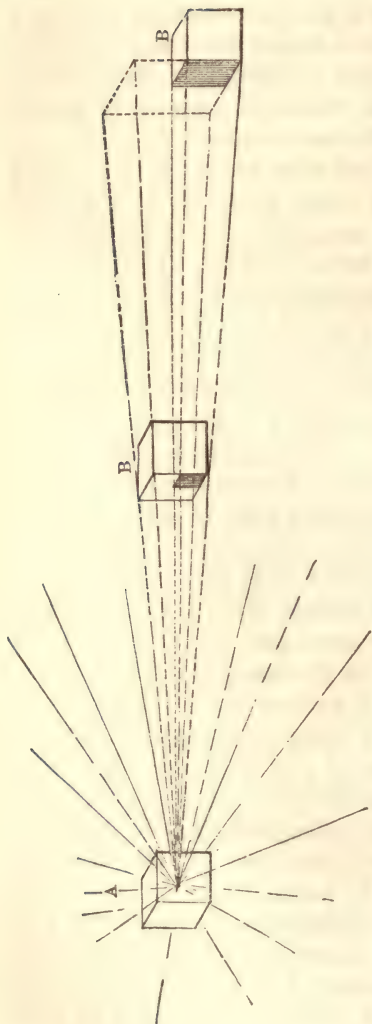
KOSMICOS. I do not wish to convince you at present of my own views on this subject, but I put before you a difficulty which you ought to solve, if you can, to your own satisfaction, before you proceed farther. You have learned of the law of gravitation; and you have imagined a being who has established this and other laws by which matter is to be governed. To this being you have imputed certain personal attributes, which you call infinite power and boundless wisdom. Observe now that the laws to which you assign this origin are of perpetual duration; they have operated without change from the remotest period of their existence just as they operate now, and we have no reason to doubt that they will continue to operate in the same way through the indefinite future. They constitute the order of Nature. Now, you suppose a Supreme Being, who has established these invariable laws, but has not left them anything to do; has not left to them the production of the solar system, but has specially interposed, and in a supernatural mode of action has constructed the machine which has the sun for its center and the surrounding bodies which revolve about it. How can you suppose that the same being has acted in different ways? How can you suppose that the being who you imagine established the general laws of Nature and gave to them a fixed operation throughout the universe, so that they never would be suspended or

interrupted, has gone aside from them, and made occasional constructions by special interpositions of his power? Is it not a contradiction to suppose that an Almighty Being, who must have acted by uniform methods without reference to occasions, has acted on certain occasions by special methods that were not uniform with his fixed laws? Does not this hypothesis imply that his fixed laws were insufficient for the purposes for which he designed them, and that he had to resort to other means? How do you get over this difficulty?

SOPHEREUS. What you propound as a difficulty does not disturb me. I understand the distinction which you make between the natural and the supernatural. I can see in the solar system how the law of gravitation and all the other laws of motion operate; but I do not see, nor can you explain, how these laws, or the laws of chemical combination or any other laws, can have evolved the plan of the solar system out of a mass of fiery vapor. I can understand the enactment and establishment of laws of motion, of chemical combination, and of the mechanical action of different states of matter upon each other, to operate in fixed and invariable ways, in certain conditions. But I do not see that there is any interruption or displacement of these laws, after they are established, when an end that is to be accomplished calls for a complex system of new objects among which they are to operate. It is manifest that the question is whether the different bodies of the solar system have been formed and placed in their respective positions, according to a special design of their relative distances, magnitudes, and orbits, or whether these are the results of the operation of fixed laws, without any special interposition of a creating power. Astronomers have not explained how the latter hypothesis is anything more than a probable conjecture. It remains for me to consider whether the hypothesis of a special interposition, whereby the plan of the solar system has been made, is

attended with the difficulty which you suggest. We are reasoning about a period of the remote past when this system of bodies did not exist, but when the general laws that were to govern all matter may be supposed to have been previously ordained. If we think of the solar system, conceived and projected by the Supreme Being, as a complex mechanism that was to exist in Nature, the occasion would be one calling for the exercise of infinite wisdom and power. The production of such a mechanism, to answer any ends for which it was intended that it should exist, implies attributes that transcend all our human experience of the qualities of power and wisdom. That it was an occasional exercise of power, in no way implies any irregularity or inconsistency of method, if the power was so exercised as to leave all the general laws of Nature in full operation, so that there would be no clashing between what you call the natural and the supernatural. I have first to ascertain what was the probably intended scope of the general laws which are supposed to have been ordained before the solar system came into existence. If it appears to have been the purpose of the constructor to have these laws work out this system of bodies without any special interposition and formative skill directly exercised, I need go no further. But I see no evidence of that purpose. No one has suggested anything but a theory on this subject, which is not supported by any satisfactory proofs. I am left, therefore, to the consideration of the question whether an act of special interposition, in the formation of a plan obviously calling for the exercise of infinite wisdom and power, is in any way inconsistent with the establishment of a system of laws which were to operate on these bodies and among them after they had come to exist. My conclusion, from what I have learned of the solar system, is, that in the exercise by the same being of the method which you call the natural, and the exercise of the method which you

call the supernatural, there is no inconsistency ; that each of the fixed laws of matter and motion was designed to have its own scope ; and that each of them may well consist, within its limitations, with occasional exercises of power, for the production of objects that were to be operated upon by the laws, but of which they were not designed to be the producing cause. Thus it seems to me to be a rational conclusion that the law of gravitation, the general laws of motion, and all the other laws of matter, which preceded the existence of the solar system, were not designed to be the agents by which the plan of that system would be worked out, but that the plan was so formed and executed that the bodies composing it would be subject to the operation of laws enacted by the Infinite Will for the government of all the forms of matter. The question is, whether the plan of the solar system is due to the operation of the fixed laws, or to a special interposition ; or, to state it in another way, whether the whole of the phenomena, the plan and arrangement of the solar system included, are to be referred to the operation of certain fixed laws as the producing agents, or whether some part of the phenomena, namely, the mechanism of the system, should be referred to the special interposition. I am taught, by the physics on which astronomers are now agreed, that gravitation is a force by which the particles of matter act on each other ; *that every particle of matter in the universe attracts every other particle with a force varying directly as their masses, and inversely as the square of the distance which separates them.* This I understand to be the formula in which the law of universal gravitation is expressed. But, for the purpose of illustrating what I understand to be the operation of this force, I have constructed a diagram, in which two bodies are represented as A and B. From each of these bodies there radiates in all directions an attracting force, which acts directly upon every other body in the universe,



and which is represented in the diagram by dotted lines. In the diagram, the bodies A and B are first supposed to be one thousand miles apart. A certain portion of the attracting rays proceeding from A would strike directly upon B. All the other rays proceeding in the same direction from A would pass on either side of B without striking it. If B is removed to the distance of two thousand miles from A, the sum total of the attractive force which A would exert upon B would be diminished by the square of the distance, because B would intercept just one fourth of the number of rays proceeding from A compared with the number which it intercepts when the two bodies are only one thousand miles apart; and the rays which B does not intercept would pass along through the realms of space, until

they encountered some other body, on which they would

exert a force that would follow the same law of diminution. In the diagram, the two bodies A and B may be single particles of matter or collections of particles ; they are represented as cubes ; but the law of direct action of the attracting force and the law of its diminution would be the same if the bodies were spheres or oblongs. The power of attraction which bodies exert upon each other resides in every individual particle of matter composing the body, and the attraction which that body exerts upon another body is the sum total of the attractions which proceed from all the particles composing the mass and which impinge upon that other body.

In the diagram the two bodies A and B are supposed to be of the same mass. If, as in the case of the sun and the earth, one of the bodies is of far greater mass than the other, then the attraction of the sun for the earth is the same as the attraction of the earth for the sun, because the action is mutual ; but the sun, being the greater mass, tends, by reason of its correspondingly greater inertia, to remain comparatively stationary, or, in other words, it has a greater resistance to being pulled out of its normal position, while the earth, having less inertia, is more easily deflected from its straight course in which its momentum tends to carry it, and so travels in an orbit around the sun, the resisting or centrifugal pull of the earth, due to its inertia, exactly balancing the inward pull due to the mutual attraction. I understand that, besides the law of universal gravitation, there are two fundamental laws of motion. By one of these laws, if a body be set in motion and be acted on by no other than the projectile force, it will move forward in a straight line and with a uniform velocity forever. But by another law, if the moving body is acted on by another force than that which originally projected it in a straight line, it will deviate from that line in the direction of that other force and in proportion to it. If A,

the earth, liable to be drawn toward B, the sun, by their mutual attraction, was originally projected into space, at a certain distance from the sun, by a force which would carry it on in a straight line, it would be acted on by two forces : the projectile force would cause it to move in a straight line ; the force of the mutual attraction would cause it to deviate from that line in the direction of the sun. The result would be that the earth would be carried around the sun in a circular or an elliptical orbit. Every other planet in the solar system would be under the operation of the same compound forces governed by the same laws ; and while the sun would exert upon each of them its force of attraction, and they would each exert upon the others an attractive force that would be diminished by the squares of their distances from one another, each of them would be deflected from the straight line that would have otherwise been the path of its motion, and the result would be a perpetual revolution around the body that could exert upon each just the amount of attraction requisite to overcome the projectile force by which it was first put in motion.

KOSMICOS. You have made an ingenious explanation of the law of gravitation, which may or may not be correct. But now let me understand what you infer from this hypothesis, supposing it to be true. What should have prevented the law of gravitation and the laws of motion from working out this very system of bodies, by operating upon a mass of crude matter lying in the universe, supposing it to have been fiery vapor or anything else ?

SOPHEREUS. I have thus far arrived, by the aid of what astronomy teaches, at a complex system of physical laws, the law of universal gravitation, and the laws of motion. I must suppose that these laws had an intelligent author. I must suppose that they were enacted, in the same sense in which we speak of any rule of action ordained by a

power competent to conceive of it and to put it into execution. To me, as I view the facts of the solar system, the idea that the law of gravitation and the laws of motion are to be regarded as mere phenomena of matter, or as qualities of matter according to which, from some inherent condition, it must act, does not explain the solar system. I can not explain to myself what I see, without asking myself how these qualities of matter came to exist. How came it to be a condition of all matter that its particles should attract each other by a certain force according to a certain rule? How came it to be a law of motion that bodies projected into space should continue to move on forever in a straight line, unless deviated from that line by some other force? To say that things happen, but that no power ever commanded them to happen; that things occur because they do occur, and not because some power has ordained that they shall occur, is to me an inconceivable kind of reasoning, if it be reasoning at all. Because men act or profess to act upon certain principles of moral conduct, I can not suppose that justice, and truth, and mercy are mere phenomena of human conduct, that they never had any origin as moral laws in the will of a law-giver. For the same reason I can not suppose that the physical laws of matter, stupendous in their scope, and of unerring certainty in their operation, did not proceed from an enacting authority. In short, it seems to me that the conception of power, as something independent of the qualities of substance, is a logical necessity.

KOSMICOS. I am not now trying to persuade you that the law of gravitation and the laws of motion did not have an intelligent author. For the purposes of the argument, I will concede that they were enacted, as you term it. You have explained your understanding of the operation of these laws as they are expressed in the formula given by astronomers, and for the present I will assume that they operate

in some such way. I will also concede that the idea of power in the abstract, as something independent of the qualities of substance, is necessary to the explanation of all physical phenomena. But I now recall your attention to the point which I originally suggested. Explain to me how it has happened that the being who you suppose established certain laws for the government of all matter has not allowed those laws to evolve out of diffused matter certain bodies which we find grouped together in the universe, but has specially interposed by another act, and constructed this system of bodies without the agency of his own laws. All that we know about the law of gravitation and the laws of motion we derive from observing the actions of these bodies which compose the solar system. We infer the existence of these laws from the actions of these bodies. Now tell me how you suppose that the same being who ordained these laws as fixed conditions to which matter was to be subjected, and made them to operate upon all matter, whether in a crude and unformed state or after it had become organized into bodies of definite shapes and dimensions, did not rely upon these inherent conditions of matter to produce those shapes and dimensions, but went to work by special interposition, and produced the mechanism of the solar system as a human artificer would make a machine of a corresponding character.

SOPHEREUS. We must take things in a certain order. I understand you to concede, for the present, that the laws of gravitation and motion must, or may, have existed before the sun and the planets were formed. We are agreed, then, that power has an existence anterior to and separate from the qualities of substance. What, then, is the difficulty attending the hypothesis that the Infinite Power, which devised and established the laws of gravitation and motion before the bodies of the solar system were formed, so fashioned and distributed those bodies that while each of them

shall exert upon every other a certain amount of direct attraction, that attraction shall diminish in a certain fixed ratio, as the distance between them increases? We can not suppose that the relative magnitudes, weights, and distances of these bodies were accidental, or that they resulted from the property of attraction that was given to the particles of matter of which they are composed. That property of mutual attraction became at some time a fixed condition of all matter, but it will not account for the formation of a system of bodies so adjusted that the attracting force will act among them by a specific law, by the operation of which they will be prevented from exerting on each other an excessive amount of such force, or any amount but that which is exactly needful to preserve their relative distances from each other. Let it be supposed that the property of attraction was impressed upon all the particles of matter in the universe, and then that the Infinite Power, abstaining from all farther action, and without forming and arranging the bodies of the solar system upon any intentional plan, left all that plan to be worked out by that property of matter; what reason have we to conclude that the law of gravitation would, as the sole efficient cause, have produced just exactly this complex piece of mechanism, so wonderfully adjusted? What reason have we to conclude that the property of attraction, although ordained as an inherent quality of all matter, would not, if left without any special interposition, have resulted in some very different arrangement and disposition of the matter lying in the space now occupied by the solar system?

KOSMICOS. Give me your idea of the condition which is called "chaos," and I will then explain to you why it is that you do not do justice to the scientific distinction between the natural and the supernatural method by which things have been produced as we see them.

SOPHEREUS. I presume you do not mean to ask how I

suppose chaotic matter came to exist. Its origin is one thing—its condition is another. In regard to its condition, it seems very plain that there was a period when diffused matter had not received the impress of the qualities or been subjected to the laws which we now recognize. Take the Mosaic hypothesis, where it speaks of the earth, for example, as “without form and void.” In this terse expression, there is embraced the idea of a condition of matter without qualities, properties, or laws; lying in an utterly crude state, waiting to receive the impress of the divine will. The laws of motion have not begun to operate upon it; the laws of chemical combination have not been applied to it. It is a rational conclusion that this was the condition of things in that remote period of eternity before the solar system was formed. Chaos, then, was the condition of primeval matter before it had received the fixed properties that were afterward to belong to it, and before the laws that were ever afterward to govern it had been ordained. Lying in this utterly crude state, without tendencies, without combinations, without definite motion, floating in the universe without fixed form or qualities, it awaits the action of the Infinite Power. It pleases that power, out of its illimitable resources, to bestow upon this chaotic matter certain properties, and to subject it to certain laws. One of these properties is that its particles shall attract one another by a certain force; one of these laws is that this force shall operate by an invariable and fixed rule of direct action, and by an invariable and fixed rule of diminution, according to the distance of the particles from each other; and another law is that a body projected into space, by any force, shall continue to move in a straight line until and unless it is deflected from that line by some other force. There are, too, chemical properties belonging to matter as we know it, by which it takes on certain combinations and undergoes modifications and arrangements of its particles.

All these properties, qualities, and laws—these unavoidable methods of action—must have been imposed upon the chaotic matter at some time by a power competent to establish them, and to put them in operation. But the laws and the methods of their operation do not account for the PLAN on which the solar system has been formed, consisting of different bodies of such shapes, dimensions, and relative distances, that the laws, when applied to them, will produce the wonderfully exact and perpetual movements which the telescope reveals. That PLAN is a *creation*, for which we must look to something more than the laws and properties of matter ; and we can only find it in the will and purposes of the infinite artificer who devised the laws by which this mechanism was to be governed after it had been made, and who has so made it that it would be governed by them.

KOSMICOS. I do not see that you have yet reached a stronger ground on which to rest the hypothesis of special interposition than that on which is based the hypothesis which imputes the formation of the solar system to certain fixed laws operating upon crude matter not yet formed into definite shapes or placed in certain relative positions. You will have to adduce some proof that has a stronger tendency to exclude the supposition that the mechanism of the solar system was produced by the laws of matter and motion working upon some material that lay in the condition which you have described as “chaos.”

SOPHEREUS. Let us, then, look a little farther into some of the details of this vast machine. Take one that is most obvious, and that lies the nearest to us ; I mean the moon, which accompanies our earth as its satellite. The most remarkable thing about the motion of the moon is the fact that she makes one revolution on her axis in the same time that she takes to revolve around the earth, and consequently she always presents to us the same face, and her other side is never seen by human eyes. How came this to be the

case? How came this to be the adjustment of the two motions, the axial revolution of the moon and her revolution around the earth, causing her always to present to us the same side? It is said by astronomers that the two motions are so exactly adjusted to each other that the longer axis of the moon always points to the earth, without the slightest variation. It is conceded, as I understand, to be infinitely improbable that this adjustment was the result of chance. A cause for it is therefore to be found. Where are we to look for that cause, unless we look for it in the will and design of the Creator, who established it for some special purpose?

KOSMICOS. You are aware that there is a physical explanation of this phenomenon which accounts for it without the special design. This explanation is that the moon was once in a partially fluid state, and that she rotated on her axis in a period different from the present one. In such a condition, the attraction of the earth would produce great tides in the fluid substance of the moon; this attraction, combined with the centrifugal force of the moon's rotation on her own axis, would cause a friction, and this friction would retard the rate of her axial rotation, until it became coincident with the rate of her revolution around the earth. It is highly improbable that the moon was originally set in rotation on her axis with just the same velocity with which she was made to revolve around the earth. This improbability is based on the ellipticity of the moon's orbit, which is caused by the attraction of the sun. The mean distance of the moon from the earth is 240,300 miles; her smallest possible distance is 221,000 miles; and the greatest possible distance is 259,600. The usual oscillation between these extremes is about 13,000 miles on each side of the mean distance of 240,300. The diameter of the moon is 2,160 miles, or less than two sevenths of the earth's diameter. In volume she is about one fiftieth as large as

the earth, but her density, or the specific gravity of her material, is supposed to be a little more than half of that of our globe ; and her weight is about three and a half times the weight of the same bulk of water. When she is nearest to the sun, the superior attraction of that body tends to draw her out of her circular orbit around the earth ; when she is farthest from the sun, this attraction is diminished, and thus her terrestrial orbit becomes slightly elliptical. But there is another attraction to be taken into account. This other attraction, in her former fluid condition, has given her the shape, not of a perfect sphere, but of an ellipsoid, or an elongated body with three unequal axes. The shortest of her axes is that around which she rotates ; the next longest is that which points in the direction in which she is moving ; and the longest of all points toward the earth. This shape of the moon, resulting from the earth's attraction, has been produced by drawing the matter of the moon which is nearest to the earth toward the earth, and by the centrifugal force which tends to throw outward the matter farthest from the earth. The substance of the moon being a liquid, so as to yield freely, she would be elongated in the direction of the earth. But if she was originally set in motion on her own axis at precisely the same rate with which she was made to revolve around the earth, the correspondence between the two motions could not have been kept up ; her axial rotation would have varied, by reason of the fact that her relative distance from the sun and the earth varies with the ellipticity of her orbit around the earth, and thus the two motions would not correspond. But if we allow for the attraction of the earth upon a liquid or semi-liquid body, producing for the moon an elongated shape, her axial rotation would, if the two motions were in the beginning very near together, vary with her revolutions around the earth, and the correspondence between the two motions would be kept up. Here, then, you have a physi-

cal explanation of the phenomenon which strikes you as so remarkable—a result brought about by natural causes, without the supposition of what you call intentional design, or formative skill directly exercised by a supernatural interposition.

SOPHEREUS. This is a very plausible theory, but it all depends upon two assumptions: First, it assumes it to be extremely improbable that the two motions were aboriginally made to correspond, by an intentional adjustment of the moon's weight, dimensions, and shape, upon such a plan that the laws of gravitation and movement would keep the two motions in exact correspondence. Why should not the rates of movement have been originally designed and put in execution as we find them? You anticipate the answer to this question by another assumption, namely, that the substance of the moon was at first in a fluid or semi-fluid state, so that she owed her present shape to the effect of the earth's attraction, and the centrifugal tendency of its most distant part to be thrown out of the line of its motion. I should be glad to have you explain why it is extremely improbable that the Creator planned this part of the solar system, the earth and its satellite, and so adjusted the dimensions, shapes, and weights of each of them, and fixed the rates of revolution of the satellite, that the laws of attraction and motion would find a mechanism which they would keep perpetually in operation, and thus preserve a constant relation between the moon's axial rotation and her revolution around the earth. I have thus far learned to regard the probable methods of the Creator somewhat differently from those which you scientists ascribe to him. Most of you, I observe, have a strong tendency to regard the Deity as having no specific plan in the production of anything, which plan he directly executed; and, so far as you regard a First Cause as the producing cause of phenomena, you limit its activity to the establishment of certain

fixed laws, and explain all phenomena upon the hypothesis that the Supreme Being—if you admit one—made no special interpositions of his will and power in any direction, after he had established his system of general laws. But to me it seems that the weight of probability is entirely against your hypothesis. In this particular case of which we have been speaking, that of the moon's revolution, the supposed improbability of an original and intentional adjustment of the two motions turns altogether on the argument that if they had been so adjusted at the beginning they would not have kept on, and this argument is supported by the assumption that the moon was at first a mass of fluid. I do not understand this mode of making facts to support theories; and I wish you would explain to me why, in this particular instance, the inference of a divine and intentional plan in the structure of this part of the solar system is so extremely improbable. To me it seems so obvious a piece of invented mechanism, that I can not avoid the conclusion that it was the intentional work of a constructor, any more than I could if I were to find a piece of mechanism under circumstances which indicated that it was produced by human hands.

KOSMICOS. You do not even yet do justice to the scientific method of reasoning. The deductions of science—the conclusions which the scientist draws from the phenomena of Nature—rest upon the postulate of fixed laws of Nature, which never change, and which have not been varied by any supernatural interference. We mean by a supernatural cause one which is not uniformly in operation, or which operates in some way different from the fixed laws which we have deduced from the observed order of the phenomena that we have studied and found to be invariable. We adopt this distinction between the natural and the supernatural because the observable phenomena of Nature do not furnish any means of discovering as a fact the operation

of anything but the fixed laws, or any cause which has acted in a different way. Let us now apply this to the phenomena which we have been considering—the composition and arrangement of the solar system. What do we find? We find a system of bodies in the movements of which we detect certain fixed laws operating invariably in the same way. When the question is asked, How were these bodies produced? we have no means of reaching a conclusion except by reasoning upon the operation of the forces which these laws disclose, working on the primordial matter out of which the bodies became formed. It is for this reason that, in accounting for their existence, we speak of the method of their formation as the natural, in contradistinction to some other method which we call the supernatural; by which latter term we mean some mode in which there has been a power exerted differently from the established and fixed agency of the laws of matter, which constitute all that we have ever discovered. The nebular hypothesis affords a good illustration of the distinction which I am endeavoring to show you, whether it is well established or not, or is ever likely to be. It supposes that there was a mass of fiery vapor, floating in the space now occupied by the solar system. Under the operation of the laws of gravitation and motion, of mechanical forces and chemical combination, this crude matter becomes consolidated and formed into the different bodies known to us as the sun and the planets, and the laws which thus formed them continue to operate to keep them in the fixed relations to each other which resulted from the process of their formation. Whether as a matter of fact the solar system was formed in this way, this, or some other mode of operation through the action of certain established laws operating upon primeval matter, is what we call the natural method, in opposition to the supernatural; and we can not discover the supernatural method, because the closest and most extensive investigations never

enable us to find in nature any method of operation but that which acts in a fixed and invariable way.

SOPHEREUS. What you have now said brings me to a question that I have all along desired to ask you : How do you know that the Infinite Power never acts, or never has acted, in any way different from the established order of Nature ? Is science able to determine this ? If it is not, it must be for philosophy to consider whether there can have been, or probably has been, in operation at any time any cause other than those fixed laws of Nature which the scientist is able to deduce from observable phenomena. Because science can only discover certain fixed laws as the forces governing the bodies which compose the solar system, or governing the materials of which they are supposed to be made, it does not seem to me that a philosopher is precluded from deducing, by a proper method of reasoning upon a study of the solar system, the probable truth that its mechanism was specially planned and executed by a special act of the creating power. The degree to which this probability rises—whether it rises higher in the scale than any other hypothesis—must depend upon the inquiry whether any other hypothesis will better account for the existence of this great object, with its enormous mechanism, its adjustments, and its unerring movements. I must say, from what I have learned of this planetary system, with the sun as its center, viewed as a mechanism, that I can conceive of no hypothesis concerning its origin and formation which compares in probability with the hypothesis that it was directly and specially created, as we know it, by the Infinite Artificer.

KOSMICOS. Pray, tell me what you mean by an act of creation ? Did you or any other man ever see one ? Can you tell what creation is ?

SOPHEREUS. I think that your question can be answered. Creation is the act of giving existence to something that

did not previously exist. We see such acts performed by men, very frequently, so that we do not hesitate to speak of the product as a created thing. We do not see acts of creation performed by the Infinite Power, but it is surely not unphilosophical to suppose that what can be and is done by finite human faculties, can be and has been done by the infinite faculties of the Deity, and done upon a scale and in a perfection that transcend everything that human power has produced. The sense in which I have been led to conceive of the solar system as a creation is the same as that by which I represent to myself the production, by human power and skill, of some physical object which never existed before, such as a machine, a statue, a picture, a pyramid, or an obelisk ; any concrete object which, whether or not new of its kind, did not as an individual object previously exist. In weighing the probabilities as to the mode in which the solar system came to exist, the reasons why the idea of its special creation stands by far the highest in the scale are these : 1. There must have been a period when this great object in nature did not exist, and therefore it must have been caused to exist. 2. The necessary hypothesis of a causing power leads inevitably to the conclusion that the power was adequate to the production of a system of bodies so proportioned and arranged that they would act on each other by certain fixed rules. 3. The causing or creating power must have conceived the proportions and arrangements of the different bodies as a plan, and must have executed that plan according to the conception. 4. While as a theory we can represent to ourselves that the causing power established certain laws of matter and motion, which would by their fixed operation on crude substances lying in the universe produce this system of bodies without any preconceived and predetermined plan, without any occasional or special interposition, yet that the system, as we find it, is a product of such a nature as to

have called for and required the special interposition of a formative will. For, if we proceed upon the hypothesis that this enormous and exact mechanism was nothing but the product of certain pre-established laws operating on crude matter, without direct and special interposition exerted in the execution of a formed design, we have to obtain some definite conception, and to find some proof of a method by which these laws can have operated to produce this system of bodies exactly as we know them to be proportioned and arranged. Astronomical science, and all other science, has not discovered, or even suggested, any method by which this result could have been brought about, without a special act of creation in the execution of an original design. On the other hand, the hypothesis of a special interposition in the execution of a preconceived plan of construction is the most rational, the most in accordance with probability, because it best meets the requirements of the case. These requirements were that the proportions, arrangements, and relations of the different bodies composing one grand mechanism, should be such that the laws of gravitation and motion would operate upon and among them so as to keep them in uniform and unvarying movement.

KOSMICOS. Very well. You have now come to the end of your reasoning. Tell me, then, why it is not just as rational a supposition that the Deity conceived of the plan of the solar system as a product that would result, and that he intended should result, from the operation of his fixed laws of matter and motion, and then left it to the unerring certainty of their operation to produce the mechanism by the process of gradual evolution?

SOPHEREUS. The being who is supposed to hold and exercise supreme power over the universe, holds a power to execute, by direct and special creation, any design which he conceives and proposes to accomplish. I am prepared to

concede that the process of gradual evolution can produce and apparently has produced some results. But when we are looking for the probable methods of the Deity in the production of such a mechanism as the solar system, we must recognize the superior probability of the direct method, because the indirect method which you describe as gradual evolution does not seem adequate to the production of such a system of bodies. If we could obtain facts which could have any tendency to show that, without any special interposition, the mechanism of the solar system, or any part of it, is a mere result of the working of the laws of gravitation and motion upon a mass of crude matter, we might yield assent to the probability of that occurrence. But of course we have no such facts ; we have nothing but theories ; and therefore there appears nothing to exclude the probable truth of a special creation.

KOSMICOS. We shall not convince each other. You have stated your conclusions concerning the solar system fairly enough, and I have endeavored to answer them. But now let me understand how you propose to apply them to other departments of Nature, in which we have means of closer investigation. You will find it very difficult, I imagine, to maintain that every organism, every plant, animal, fish, insect, or bird, is a special creation, or even that man himself is.

SOPHEREUS. Let me state for myself just what my conclusions are in regard to the solar system. You will then know what the convictions are with which I shall come to the study of other departments. I have arrived at the conception of an Infinite Being having the power to create anything that seems to him good ; and I have experienced no difficulty in conceiving what an act of creation is. I have also reached the conviction that there is one great object in Nature, the existence of which I can not account for without the hypothesis of some special act of creation.

Whether I shall find this to be the case in regard to every other object in Nature, I can not now tell. Perhaps, as many of these objects are nearer to us, and more within our powers of investigation, the result may be different. I shall endeavor to keep my mind open to the necessary discriminations which facts may disclose. Possibly I may find reason to reverse the conclusions at which I have arrived in regard to the solar system, if I find that the hypothesis of evolution is fairly sustained by other phenomena.

NOTE.—Newton, whose reasoning powers have certainly not been surpassed by those of any other philosopher, ancient or modern, not only deduced the existence of a personal God from the phenomena of Nature, but he felt no difficulty in ascribing to the Deity those personal attributes which the phenomena of Nature show that he must possess, because without them “all that diversity of natural things which we find suited to different times and places” could not have been produced. They could, he reasons, “arise from nothing but the ideas and will of a Being necessarily existing.” Newton does indeed say that all our notions of God are taken from the ways of mankind; but this is by way of allegory and similitude. There is a likeness, but not a perfect likeness. There is therefore no necessity for ascribing to God anthropomorphic attributes, because the enlargement of the faculties and powers to superhuman and boundless attributes takes them out of the category of anthropomorphic qualities and capacities. In his “Mathematical Principles of Natural Philosophy,” Newton had occasion to treat of the theory of vortices, as a hypothesis by which the formation of the solar system is to be explained. The “General Scholium,” by which he concludes the third book of his “Principia,” lays down the masterly reasoning by which he maintains that the bodies of the solar system, while they persevere in their orbits by the mere laws of gravity, could by no means have at first derived the regular position of the orbits themselves from those laws. I had written the whole of the preceding chapter on the origin of the solar system just as I have printed it, before I looked into the “Principia” to see what confirmation might be derived from Newton’s speculations. I found that while I had not included the comets in my examination of the solar system, but had confined myself to the bodies that are at all times within the reach of the telescope, the same deductions are re-enforced by the comets, eccentric as are the orbits through which they range into and out of our system. I quote the entire

Scholium, as given in Motte's English translation of the "Principia" from the Latin in which Newton wrote, published with a Life by Chittenden, at New York, in the year 1848.

"GENERAL SCHOLIUM.

"The hypothesis of vortices is pressed with many difficulties. That every planet by a radius drawn to the sun may describe areas proportional to the times of description, the periodic times of the several parts of the vortices should observe the duplicate proportion of their distances from the sun; but that the periodic times of the planets may obtain the sesquiplicate proportion of their distances from the sun, the periodic times of the parts of the vortex ought to be in the sesquiplicate proportion of their distances. That the smaller vortices may maintain their lesser revolutions about *Saturn*, *Jupiter*, and other planets, and swim quietly and undisturbed in the greater vortex of the sun, the periodic times of the parts of the sun's vortex should be equal; but the rotation of the sun and planets about their axes, which ought to correspond with the motions of their vortices, recede far from all these proportions. The motions of the comets are exceedingly regular, are governed by the same laws with the motions of the planets, and can by no means be accounted for by the hypothesis of vortices; for comets are carried with very eccentric motions through all parts of the heavens indifferently, with a freedom that is incompatible with the notion of a vortex. Bodies projected in our air suffer no resistance but from the air. Withdraw the air, as is done in Mr. *Boyle's* vacuum, and the resistance ceases; for in this void a bit of fine down and a piece of solid gold descend with equal velocity. And the parity of reason must take place in the celestial spaces above the earth's atmosphere; in which spaces, where there is no air to resist their motions,

all bodies will move with the greatest freedom ; and the planets and comets will constantly pursue their revolutions in orbits given in kind and position, according to the laws above explained ; but though these bodies may, indeed, persevere in their orbits by the mere laws of gravity, yet they could by no means have at first derived the regular position of the orbits themselves from those laws.

“The six primary planets are revolved about the sun in circles concentric with the sun, and with motions directed toward the same parts, and almost in the same plane. Ten moons are revolved about the earth, Jupiter, and Saturn, in circles concentric with them, with the same direction of motion, and nearly in the planes of the orbits of those planets ; but it is not to be conceived that mere mechanical causes could give birth to so many regular motions, since the comets range over all parts of the heavens in very eccentric orbits ; for by that kind of motion they pass easily through the orbits of the planets, and with great rapidity ; and in their aphelions, where they move the slowest, and are detained the longest, they recede to the greatest distances from each other, and thence suffer the least disturbance from their mutual attractions. This most beautiful system of the sun, planets, and comets, could only proceed from the counsel and dominion of an intelligent and powerful Being. And if the fixed stars are the centers of other like systems, these being formed by the like wise counsel, must be all subject to the dominion of One ; especially since the light of the fixed stars is of the same nature with the light of the sun, and from every system light passes into all the other systems ; and lest the systems of the fixed stars should, by their gravity, fall on each other mutually, he hath placed those systems at immense distances one from another.”

CHAPTER IX.

Does evolution account for the phenomena of society and of nature?—

Necessity for a conception of a personal actor—Mr. Spencer's protoplasmic origin of all organic life—The Mosaic account of creation treated as a hypothesis which may be scientifically contrasted with evolution.

A LONG interval has elapsed since the conference described in the last chapter, between the searcher after wisdom and his scientific friend. At their next interview they take up the subject of a First Cause where they left it at the conclusion of their debate on the solar system.

KOSMICOS. Well, Sosphereus, what have you been studying since we last met ?

SOPHEREUS. Many things. I have been studying what is commonly called Nature, and I have been studying society. With regard to society, I have been endeavoring to discover to what the phenomena of social life are to be attributed as their producing cause or causes ; whether they can be said to owe their existence to the direct action or influence of intelligent wills, or are to be considered as effects produced in the course of an ungoverned development, wrought by incidental forces in varying conditions of human existence. The latter, I find, is one of the theories now prevailing.

KOSMICOS. And what is your conclusion ?

SOPHEREUS. My general conclusion in regard to the phenomena of human society is the same as that which I formed from a study of the phenomena of the solar system. I find a great many things which I can not explain without

the hypothesis of a direct creating power exerted by an intelligent being. I know that you object to the idea of creation, but I explained to you in our last discussion that I understood it to mean the causing something to exist which did not exist before, and the doing it by an intentional and direct act of production.

KOSMICOS. No matter about your definition. What are the facts that you propose to discuss ?

SOPHEREUS. In the social phenomena I find many acts of creation. I do not find that buildings spring out of the ground without human intervention, or that machinery is formed by the spontaneous arrangement of matter in certain forms and relations, or by the tendencies that are implanted in matter as its inherent properties. I find an enormous multitude of concrete objects, formed out of dead matter, by human intervention, availing itself of those properties of matter, which without such active intervention would have remained quiescent, and would not have resulted in the production of these objects. It is a common form of expression to speak of the "growth" of cities, but no one understands by this form of speech that a city has become what it is without the action of numerous individuals projecting and building their separate structures, or without the combined action of the whole body of the inhabitants in determining and executing a general plan to which individuals are to conform, more or less exactly, their particular erections. Again, I find that there are rules of social life, which take the form of what are called "laws," and these are imposed by the will of some governing authority ; they are always the product of some one human will, or of the collective will of a greater number of persons. I have looked into history and have found many instances of military conquest, invasions of the territory inhabited by one race of men by another race, domination of different dynasties, overthrow of one governing power, and

substitution of another. Although the changes thus produced are often very complex, sometimes rapid and sometimes slow in reaching the consequences, I do not find that they have ever taken place without the direct action of some one human will, or of the aggregate force of many human wills. The conquests of Alexander and Napoleon are instances of what a single human will can do in changing the condition of nations; and I have not been able to read history by the interpretation that makes such men mere instruments in the hands of their age, which would, without their special existences and characters, have brought about the same or something like the same results. The invasions of the Roman Empire by the Northern barbarians are instances of the pressure of one population upon another, not attributable, perhaps, to the will and leadership of any one individual, but produced by the united force of a great horde of individuals determined to enjoy the plunder which a superior civilization spread before them. Then, with regard to the phenomena of what are called constitutions of government, or the political systems of exercising public authority, I find numerous cases in which the force of an individual will and intelligence has been not only a great factor, but by far the largest factor in the production of particular institutions. The genius of Cæsar, and his extraordinary constructive faculties, molded the institutions of Rome in the most direct manner, and created an imperial system that lasted for a thousand years, and that even out of its ruins affected all subsequent European civilization. In such cases, more than once repeated in modern times, the particular circumstances of the age and the co-operation of many other individuals have helped on the result, but the conception, the plan, the purpose, and the execution, have had their origin in some one mind. But for the individual character, the ambition, the force, and the mental resources of the first Napoleon, can one believe that the first French

Empire of modern times would have grown out of the condition of France? Suppose that Oliver Cromwell had never lived. The protectorate, the system of government which he gave to England, was the most absolute product of the will and intellect of one man that the world in that kind of product had ever seen; for, although the people of England were ready for and needed that system, and although the antecedent and the surrounding circumstances furnished to Cromwell many materials for a political structure that was not the old monarchy, and yet had while it lasted all the vigor, and more than the vigor, of the old monarchy, still, without his personal characteristics, his ambition to found a dynasty on the wants of his country, and his personal capacity to devise and execute such a system, one can not believe that England would have had what he gave her. What he could not give her was a son capable of wielding the scepter which he had fashioned. Here is this America of yours—a country in which, to a certain extent, the political institutions have been influenced by the circumstances that followed the separation of your colonies from the English crown. Undoubtedly, your ancestors of the Revolutionary epoch could not construct a monarchy for the group of thirteen newly existing States, each with its right and enjoyment of an actual autonomy. The habits and genius of the people forbade the experiment of monarchical or aristocratic institutions; no materials for either existed. But within the range of republican institutions there was a choice open, and the people exercised that choice. They made one system of confederated States, and found it would not answer. They then deliberately assembled their wisest and greatest men. They gave to them a commission that was restricted by nothing but the practical necessity of framing a government that would unite the requirements of power with the requirements of liberty. The result was the Constitution of the United

States—a system of government that was, within the limitations of certain practical necessities, both in its fundamental principles and in many of its details, the deliberate choice and product of certain leading minds, aided by the public consent, to a degree that is almost unparalleled in the formation of political institutions. After it had gone into operation, it was believed that the requirements of liberty had not been sufficiently regarded, and it was directly and purposely modified by the intervention of the collective will of the whole people. And when I turn to the history of philosophies, of religions, of the fine arts, or of the mechanical arts, I find everywhere traces of the force of individual genius, of the direct intervention of individual wills, and of the power of men to cause new systems of thought and action to come into existence, and to create new objects of admiration or utility. In regard to languages, I have read a good deal about the controversy concerning their origin, but I have observed one thing to be very apparent: whether the gift of articulate speech was bestowed on man, when he had become a distinct being, in a manner and for a purpose which would distinguish him from all the other animals, or whether it became a developed faculty akin to that by which other animals utter vocal sounds intelligible to those of their species, it is certain that in man there is a power of varying his vocal utterances at pleasure, which is possessed by no other creature on this earth. The expansion of languages, therefore, the coinage of new words, the addition of new inflections, the introduction of new shades of meaning, the method of utterance which is called pronunciation, and the different dialects of the same tongue, are all matters which have been under the control of individuals dwelling together, and have all resulted from the arbitrary determination of more or less numerous persons, followed by the great mass of their nation, their race, or their tribe. Even when a new and third language has been

formed by the contact of two peoples speaking separate tongues, we may trace the same arbitrary adoption of parts of each separate tongue, in the first beginning of the fusion, and the new language consequently exhibits a greater or a less predominance of the characteristics of one of its parent tongues, according as the one population has compelled the other to adopt the greater part of its peculiar modes of speech.

KOSMICOS. You have gone over a good deal of ground, but now what do you infer from all this, supposing that you have taken a right view of the facts?

SOPHEREUS. I infer that, as in the social phenomena there are products and effects which have owed their existence to human will and direct human action, so, in other departments, for example, in the domain which is called Nature, and which is out of the sphere of human agency and human force, it is reasonable to conclude that there are products and effects which must have owed their existence to a will and a power capable of conceiving and producing them. And this is what leads me, as I was led in the examination of the solar system, to the idea of a Supreme Being, capable of producing those objects in nature which are so varied, so complex, so marvelously constructed, so nicely adapted to the conditions of each separate organism, that if we attribute their existence to any intelligent power, it must be to a power of infinite capacities, since nothing short of such capacities could have conceived and executed them.

KOSMICOS. You have now come to the very point at which I have been expecting to see you arrive, and at which I will put to you this question: Why do you personify the power to which you trace these products in the natural world? Substitute for the term God, or the Creator, the power of Nature. You then have a force that is not only immense, but is in truth without any limit—a

force that embraces everything, gives life to everything, is at once cause and effect, is incessantly active and inexhaustible. It commands all methods, accomplishes all objects, and uses time, space, and matter as its means. Why do you personify this all-pervading and sufficient power of Nature? Why make it a being, a deity, when all you know is that it is a power? "Where wast thou when I laid the foundations of the world?" is a question that God is supposed to have asked of Job; and it simply shows that Job had been traditionally taught to believe that there is such a being as God, and that that being laid the foundations of the world. Substitute Nature in the question, let Nature ask the question, and it is just as pertinent, and involves the same problem of human existence. Where was man when Nature began to exhibit that power which has evolved all things that we see out of the primeval nothingness?

SOPHEREUS. Well, here I must say that you have left out certain ideas that are essential to all true reasoning on this subject. Power without a guide, power without control, power without a determining will, power that acts without a volition which determines the how and the when, is a thing that I can not conceive. I thought that in our former conversation, when we were considering the solar system, you conceded that power, as something abstracted from substance or its properties, was a logically necessary conception.

KOSMICOS. I did. But I did not concede that power must be converted into a person. You must not misunderstand me. It certainly is my idea that power is a thing to be contemplated by itself; and we are surrounded everywhere by its manifestations. But it is not my idea that it is held and exercised by the being called God, or by any being. We only know of it by its effects; and these show that Nature is, after all, both cause and effect, manner and

execution, design and product. You can go no farther. You can not go behind Nature and find a being who sat in the heavens and laid the foundations of the world, unless you mean to accept a story which wise men have at last abandoned along with many kindred beliefs which came from the ages of the greatest ignorance.

SOPHEREUS. Pardon me : the question that was put to Job has more than one aspect. But I have considered the narrative that is found in the first chapter of Genesis only as a hypothesis to be weighed with other hypotheses of the origin of the world and its inhabitants. I have studied the phenomena to which you give the name of Nature, and I will tell you what seems to me to be a postulate necessary to be carried into that study. I have observed that in the works of man two things are apparent : One is, that power is exercised ; the other is, that the exercise of the power is always accompanied by a determining will, which decides that the power shall be exerted, or that it shall be deferred, or that it shall be applied variously as respects the mode and the time. In human hands, power is not illimitable, but within certain limitations it may be exercised, and it is always under the guidance of a will. A man determines to build a house ; he decides on its dimensions, and when he will begin to erect it. A general determines to attack the enemy on a certain day, and he marshals his forces accordingly. A people determine to change their government, and they decide what their new government shall be. An artist determines to paint a certain picture, and he paints it. Whenever we see human power exercised, so that we can connect product and power, the power itself is put in motion by an intelligent will. I say, therefore, that the idea of power without a controlling will, without a determining design, is inconceivable : for I am obliged to draw my conclusions from what I observe, and certainly the phenomena of society do not present any instances of a product re-

sulting from an exercise of power without a determination to exercise it. Power diffused, power without guidance, power moving by its own volition and without the volition of any intelligent being, is not exhibited in the works of man.

KOSMICOS. But we are now dealing with the works of Nature ; and the question is, whether the power that is manifest in Nature is, to adopt your language, under the control or guidance of a being who is something other than the power itself. You must remember that this is a domain in which you can see nothing but products and effects. You must also remember that if the immensity and variety of those products and effects lead to the conclusion that the power transcends all human faculty, is superhuman, and, so far as we can tell, boundless, all that we can know is that the power itself is illimitable. The quality of an infinite and illimitable capacity may be imputed to the power of Nature, because a power without limit seems necessary to the production of such effects as we see. But here we must stop. We have no warrant for believing that the power which we trace in the phenomena of Nature is held and controlled by a person, as man holds and controls the power which he exercises with his hands. What we see in Nature is the exercise of an immense and apparently boundless power. But the imputation of that power to a being distinct from the power itself, is a mere exercise of the human imagination, without any proof whatever. See how this imagination has worked at different periods. Monotheism and polytheism are alike in their origin. The one has imputed to different beings all the phenomena in the different departments of Nature, one being having the charge and superintendence of one department and another being having another department. Good and evil have thus been parceled out to different deities or demons. On the other hand, monotheism attributes all to some one being, and his existence is no

more rational than the existence of the whole catalogue of the mythologies of all antiquity, or the stupid beliefs of the present barbarous tribes. But Nature is a great fact, or rather a vast store-house of facts, which we can study ; and what we learn from it is that there is a power which Nature is constantly exerting, which is without any assignable limit, which is itself both cause and effect, and beyond this we can not go.

SOPHEREUS. Let us see if you are correct. In the first place, do you not observe that the tendency of mankind to personify the powers of Nature is one of the strongest proofs of the logical necessity for an interpretation which seeks for an intelligent being of some kind as the actor in the production of the phenomena ? It is the fashion, I find, among a certain class of philosophers, to impute this propensity to the proneness of the human mind toward superstitious beliefs ; to the mere effect of poetical or imaginary temperament in certain races of men, or to fear in other races ; or to a vague longing for some superior being who can sympathize with human sorrows or assist human efforts. Something of all these influences has, no doubt, in different degrees and in various ways, worked itself into the religious beliefs of mankind. But neither any one of them, nor the whole of them, will satisfactorily account for either polytheism or monotheism. We must go deeper. There has been an unconscious reasoning at work, more or less unconscious, which has led to the conclusion that power, the manifestation of power, necessarily implies that the power is held and wielded by some intelligent being. The beliefs of mankind, whether embracing one such being or many, have not been the mere results of superstition, or fear, or longing for divine sympathy, or for superhuman companionship or protection. Those beliefs owe as much to the reasoning powers of mankind as they do to the influence of imagination. In many ages there have been powerful intel-

lects, which have been free from the influence of superstition or fancy, and which have recognized the logical necessity for a conception of power as a force that must be under the guidance and control of intellect. While the popular belief has not attained this conviction by the same conscious and logically conducted process of reasoning, it has been unconsciously led through the same process, by what is open to the observation of human faculties, even in the less civilized portions of the human race. The savage who is sufficiently raised above the brute creation to exercise his own will and intelligence in the pursuit of his game, or in building his wigwam, or in fighting his enemy, knows that he exercises a power that is under his own control ; and, as soon as he begins to observe the phenomena of Nature, he conceives of some being who holds a like power over the material universe, and whom he begins to personify, to propitiate, and to worship. This is the result of reasoning : feeble in some cases, but in all cases the intellectual process is the same. Now let us see whether this process is a sound one. Are you sure that you are correct in saying that the power of Nature is without limit ? Is there a single force in Nature, a single property of matter, or any sequence of natural events, that is not circumscribed ? Do not the very regularity and uniformity of the phenomena of Nature imply that some authority has said, from the beginning, Thus far shalt thou go and no farther ? You surely do not imagine that the law of universal gravitation made itself, or that it settled itself into an exact and invariable method of action by the mere force of habit, beginning without prescribed and superimposed limits, and finally resulting in a fixed rule which never changes. You do not imagine that the mysterious, impalpable motion to which is now given the name of electricity, created for itself, as a matter of habit, the perpetual tendency to seek an equilibration of the quantity accumulated in one body with the quantity that is con-

tained in another, by transmission through intermediate bodies ; or that it established for itself the conditions which make one substance a better conducting medium than another. You do not suppose, I take it, that certain particles of matter adopted for themselves a capacity to arrange themselves in crystals of certain fixed combinations and shapes, and that other particles of matter did not choose to take on this habit. All these forces, powers, and tendencies are of very great extent, much beyond any that man can exercise ; but they all have their limitations, their prescribed and invariable methods of action ; they all act as if they have been commanded to act in a certain way and to a certain extent, and not as if they have chosen for themselves both method and scope. Now, is it not a rational deduction that what is really illimitable is not the power of Nature, but the power which made Nature what it is ? Is it not a necessary conclusion that, inasmuch as all Nature acts within certain limits, stupendous and minute and varied as the products or effects may be, there must have been behind Nature a power that could and did prescribe the methods, the limitations, the lines within which Nature was to move and act ? You can not put into the mouth of Nature the question, Where wast thou (Man) when I laid the foundations of the world ? without suggesting the retort, Where wast *thou* (Nature) when the foundations of the world *were* laid ? And this question Nature can no more answer, for itself, than man can answer for himself when the question is put to him. Each must answer, I was nowhere—I did not exist. Each must answer, There was a power which called me into being, which prescribed the conditions of my existence, which gave me the capacities that I possess, which ordained the limitations within which I was to act.

KOSMICOS. And all this you derive from the fact that a being whom we call Man has some power over matter ; that he has an intelligent faculty by which he can do certain

things with matter, and that he actually does produce certain concrete forms of new things that he did not find made to his hand. Is this the basis of your reasoning about the origin of Nature?

SOPHEREUS. It is, and I will tell you why. Man is the one being on this earth in whom we find an intelligent will and constructive faculty united, to a degree which shows a power of variation and execution superior to that of all other beings of whose actions we have the direct evidence of our senses. We might select one or more of the inferior animals, and find in them a strong constructive faculty; but we do not find it accompanied by a power of variation and adaptation that is equal to that of man in degree, or that is probably the same in kind. I will not insist on the distinction between reason and instinct, but I presume you will admit that, when we compare the constructive faculty of man and that of the most ingenious and wonderfully endowed animal or insect, the latter acts always under an implanted impulse, which we have no good ground for regarding as of the same nature as man's reasoning power, however striking may be the products. When, therefore, we select the human power of construction or creation as the basis of reasoning upon the works of Nature, we resort to a being in whom that power is the highest of which we have direct evidence. In the works of man we have direct and palpable proof that the phenomena—the products of human skill and human force—are brought about by the faculties of an intelligent and reasoning being. If we dig into the earth and find there a statue, an implement, or a weapon, we do not hesitate to conclude that the spot was once inhabited by men, just as surely as we should conclude the same thing if we found there human bones. The world, above-ground and below-ground, is full of concrete objects that we know must have been fashioned by human skill, guided by human intelligence. This intelligence, this in-

tellect, is not matter ; it is a being ; it is a person. It is not a force, acting without consciousness ; it is a being wielding a force which is under the control of volition. The force and the volition are both limited, but within the limitations they constitute the power of man. Pass, then, to the works of Nature, or to what you call the power of Nature. As, in the case of man, you can not conclude that he created for himself his own faculties, that he prescribed for himself the limitations of his power over matter, or that he formed those limitations as mere matters of habit, or that it was from habit alone that he derived his great constructive powers, so, in studying the works of Nature, you must conclude that some intelligent being made the laws of matter and motion, prescribed the unvarying order and method of action, laid down the limitations, originated the properties, and, in so doing, acted by volition, choice, and design. The distinction, as I conceive, between man and Nature is, that there has been bestowed on man, in a very inferior degree, a part of the original power of creation. On Nature there has been bestowed none of this power. As we find that the existence of man as an intelligent being, endowed with certain high faculties, among which is a certain degree of the power of creating new objects, can not be accounted for without the hypothesis of a creator, still less can we account for the existence and phenomena of Nature, which has in itself no degree of the creating power, without the same hypothesis.

KOSMICOS. Stop where you are. Why do you separate man from Nature ? Have you yet to learn that man is a part of Nature ? I suspect you have, after all, been reading the book of Genesis for something more than a hypothesis, and that you have adopted the notion that God made Adam a living soul. Put away all the nursery-stories, and come down to the "hard-pan" of actual facts, which show

by an overwhelming array of evidence that man had a very different origin.

SOPHEREUS. You know, my friend, that I never learned any nursery-stories, and therefore I have none to unlearn. It may be my misfortune, but I find myself here in the world in mature years, studying the phenomena of life, without having had any early teaching, but with such reasoning as I can apply to what I observe, and to what science, history, and philosophy can furnish to me. I belong to no church, to no sect, to no party, and I have not even a country. I am a citizen of the world, on my travels through it, learning what I can. Now, what are your facts? Let us get down, as you say, upon the "hard-pan," and make it as hard as you please.

KOSMICOS. First answer my question: Why do you separate man from Nature?

SOPHEREUS. I know very well that in a certain sense man is a part of Nature. But it is necessary to contemplate man apart from all the rest of Nature, because we find that he is endowed with intellect, and we have very good and direct evidence that his intellect is an actor; and we know that he is endowed with consciousness, and we have very good and direct evidence that, by introspection, he becomes aware of his own consciousness, and what it is.

KOSMICOS. Very well, assume all that if you choose. Now let me show you an origin of man, with his intellect and consciousness, which will entirely overthrow the idea that he was a special creation in the sense to which you seem to be drifting, namely, that of miraculous interposition by a being called God. You must be aware, as you have read so much, that modern science has made great discoveries, and that there are certain conclusions on this subject which are drawn from very numerous and important data. Those data involve the origin of all the different animals, man included. They are all to be accounted for

in the same way and by the same reasoning. Now, if we go back to a period when none of them existed, we find a method of accounting for them that is infinitely superior as a hypothesis to any idea of their special creation as an act or as a series of acts of divine and direct interposition. I will take this method as it is given by Herbert Spencer, because, as he has reasoned it, it accounts for both intellect and consciousness; and Mr. Spencer is allowed to be one of the leading minds of this age. Mark the starting-point of his whole philosophy on this subject of organic life. Darwin, as you know, supposes some one very low form of organic life, an aquatic grub, and out of it he evolves all the other animal organisms, by the process of natural and sexual selection, through successive generations, ending in man. This hypothesis leaves the original organism to be accounted for, and, although Darwin does not expressly assert that it was the Creator who fashioned the first organism, he leaves it to be implied. Spencer, on the other hand, explicitly denies the absolute commencement of organic life on the globe. Observe that the terms of his theory of evolution are much more complete than Darwin's, for he says that "the affirmation of universal evolution is in itself a negation of an absolute commencement of anything. Construed in terms of evolution, every kind of being is conceived as a product of modifications wrought by insensible gradations on a pre-existing being; and this holds as fully of the supposed commencement of organic life, or a first organism, as of all subsequent developments of organic life." *

You will see, therefore, that the idea of a Creator, fashioning a type of animal organism, or making a commencement of organic life, is excluded by this great philosopher, although he does concur in the main in Darwin's general ex-

* "Biology," i, p. 482.

planation of the mode in which one organism is evolved out of a pre-existing organism. He goes much farther, because his system of universal evolution embraces the elements out of which any organic life whatever has been developed, and negatives the idea of any absolute commencement of anything whatever. He begins with the original molecules of organizable matter. By modifications induced upon modifications these become formed, by their inherent tendencies, into higher types of organic molecules, as we see in the artificial evolution effected by chemists in their laboratories; who, although they are unable to form the complex combinations directly from their elements, can form them indirectly through successive modifications of simpler combinations, by the use of equivalents. In Nature, the more complex combinations are formed by modifications directly from the elements, and each modification is a change of the molecule into equilibrium with its environment, subjecting it, that is to say, to new conditions. Then, larger aggregates, compound molecules, are successively generated; more complex or heterogeneous aggregates arise out of one another, and there results a geometrically increasing multitude of these larger and more complex aggregates. So that by the action of the successive higher forms on one another, joined with the action of the environing conditions, the highest forms of organic molecules are reached. Thus in the early world, as in the modern laboratory, inferior types of organic substances, by their mutual actions under fit conditions, evolved the superior types of organic substances, and at length ended in organizable protoplasm. Now, let me read to you Mr. Spencer's description of the mode in which the substance called "protein" becomes developed into organic life. "And it can hardly be doubted," he says, "that the shaping of organizable protoplasm, which is a substance modifiable in multitudinous ways with extreme facility, went on after the same manner. As I learn

from one of our first chemists, Prof. Frankland, protein is capable of existing under probably at least a thousand isomeric forms; and, as we shall presently see, it is capable of forming, with itself and other elements, substances yet more intricate in composition, that are practically intricate in their varieties of kind. Exposed to those innumerable modifications of conditions which the earth's surface afforded, here in amount of light, there in amount of heat, and elsewhere in the mineral quality of its aqueous medium, this extremely changeable substance must have undergone, now one, now another, of its countless metamorphoses. And to the mutual influences of its metamorphic forms, under favoring conditions, we may ascribe the production of the still more composite, still more sensitive, still more variously-changeable portions of organic matter, which, in masses more minute and simpler than existing *protozoa*, displayed actions varying little by little into those called vital actions, which protein itself exhibits in a certain degree, and which the lowest known living things exhibit only in a greater degree. Thus, setting out with inductions from the experiences of organic chemists at the one extreme, and with inductions from the observations of biologists at the other extreme, we are enabled to deductively bridge the interval—are enabled to conceive how organic compounds were evolved, and how, by a continuance of the process, the nascent life displayed in these becomes gradually more pronounced.” *

It is in this way that Spencer accounts for the formation of the cell which becomes developed into a living organism, out of which are successively evolved all the higher forms of animal organisms, until we reach man.

SOPHEREUS. And is this put forward as something which rational people are to believe?

* “Biology,” i, Appendix, pp. 483, 484.

KOSMICOS. Undoubtedly it is put forward as something that is to be believed, because it is supported by a vast array of evidence ; and let me tell you that this conception of Nature as a whole is the consummate flower of this nineteenth century in the domain of philosophic speculation.

SOPHEREUS. Perhaps it is. But although this nineteenth century has witnessed many great scientific discoveries, and has produced extraordinary inventions, I do not find that among the speculative philosophers of this age there are such very superior powers of reasoning displayed that we ought to regard them as authorities entitled to challenge our acceptance of their theories without examination. I must say that among your scientific people of the present day, and especially among the philosophers of the class of which Mr. Spencer is the leading representative, there are certain tendencies and defects which surprise me. One of their defects is that they do not obviate remote difficulties, perhaps because they have not been trained, as other men have, to foresee where such difficulties must arise. This is sometimes apparent even when the difficulties are not very remote, but are quite obvious. One of their tendencies is to arrive at a theory from some of the phenomena, and then to strain the remaining phenomena to suit the theory ; and sometimes they proceed to the invention or imagination of phenomena which are necessary to the completion of a chain of proof. This last process is called bridging the interval. I will now apply this criticism to Mr. Spencer's philosophy of the origin of man. In the first place he has not obviated a fundamental difficulty, whether it be a near or a remote one. Where did the molecules get their tendency or capacity to arrange themselves into higher and more complex forms ? Whence came the auxiliary or additional force of their surrounding environment ? What endowed *protein* with its capacity

to assume a thousand isomeric forms? What made the favoring conditions which have helped on the influence of its metamorphic tendencies, so as to produce still more sensitive and variously-changeable portions of organic matter? These questions must have an answer; and, when we ask them, we see the significance of the inquiry, "Where wast thou (man) when I laid the foundations of the world?" For these things, on the evolution theory, *are* the foundations of the world. It is no answer to say, as Mr. Spencer does, that these tendencies, or capacities of matter, and these laws of the favoring conditions, came from the Unknown Cause. Known or unknown, did they have a cause, or did they make themselves? Did these, the foundations of the world, have an origin, or were they without any origin? If they had an origin, was it from the will and power of a being capable of giving existence to them and prescribing their modes of action? If they had no origin, if they existed from all eternity, how came it that they formed this extraordinary habit of invariable action in a certain method, which amid all its multiformity shows an astonishing persistency? If we deny, with Mr. Spencer, the absolute commencement of organic life on the globe, we must still go back of all the traces of organic life, and inquire whence matter, molecules, organized or unorganized, derived the capacities or tendencies to become organized, and how the favoring conditions became established as auxiliary or subsidiary forces. And therefore it is that this difficulty, whether remote or near at hand, is not met by Mr. Spencer: for whether we call the cause an unknown or a known cause, the question is, Was there a cause, or did the foundations of the world lay themselves? The reasoning powers of mankind, exercised by daily observation of cause and effect, of creative power and created product, are equal to the conception of a First Cause as a being who could have laid the foundations of the world, but they are

utterly unequal to the conception that they had no origin whatever. Again, consider how numerous are the missing links in the chain of evolution, how many gaps are filled up by pure inventions or assumptions. The evolution of one distinct and perfect animal, or being, out of a pre-existing animal or being of a different type, has never been proved as a fact. Yet whole pedigrees of such generation of species have been constructed upon the same principles as we should construct the pedigree of an individual. Furthermore, if we regard the facts about which there can be no controversy, we find not only distinct species of animals, but we find the same species divided into male and female, with a system of procreation and gestation established for the multiplication of individuals of that species. Now go back to the imaginary period when protein began to form itself into something verging toward organic life, and then there became evolved the nascent life of an organized being. How did the division of the sexes originate? Did some of the molecules or their progressive forms, or their aggregates, or masses, under some conditions, tend to the production of the male, and others under certain conditions tend to the development of the female, so that the sexes were formed by a mere habit of arrangement without any special intervention? Here is one of the most serious difficulties which the doctrine of evolution, whether it be the Darwinian or the Spencerian theory, has to encounter. There is a division into male and female: there is a law of procreation by the union of the two sexes. This is a fact about which there can be no dispute. It is one of the most remarkable facts in Nature. It is the means by which species are continued, and the world is peopled with individuals of each species. Is it conceivable that this occurred without any design, that it had no origin in a formative will, that it had, properly speaking, no origin at all, but that it grew out of the tendencies of organized matter to take on

such a diversity in varying conditions? And if the latter was all the origin that it had, whence came the tendencies and whence the favoring conditions that helped them on toward the result? It seems to me that the Spencerian theory, so far as it suggests a mode in which the two sexes of animals came to exist, is hardly less fanciful than what Plato has given us in his "Timæus." I have studied them both.

If you will hand me Mr. Spencer's work from which you have just quoted, I will point out a passage which fully justifies my criticism. It is this: "Before it can be ascertained how organized beings have been gradually evolved, there must be reached the conviction that they have been gradually evolved." He says this in praise of De Maillet, one of the earliest of the modern speculators who reached this conviction, and whose "wild notions" as to the way should not make us, says Mr. Spencer, "forget the merit of his intuition that animals and plants were produced by natural causes."* That is to say, first form to yourself a theory, and have a thorough conviction of it. Then investigate, and shape the facts so as to support the theory. Is it not plain that an inquiry into the mode in which organized beings have been gradually evolved must precede any conclusion or conviction on the subject? It is one of those cases in which the *how* a thing has been done lies at the basis of the inquiry whether it has probably been done at all. If a suggested mode turns out to be wild and visionary, what is the value of any "intuition" of the main fact? But, what is still more extraordinary in this kind of deduction, which is no deduction, is the way in which, according to Mr. Spencer, the first conviction is to be reached before one looks for the facts. The process of the evolution of organisms, according to Mr. Spencer's philoso-

* "Biology," i, p. 408.

phy, is contained as a part in the great whole of evolution in general. We first convince ourselves that evolution obtains in all the other departments of Nature, and is the interpretation of all their phenomena. Then we conclude that it has obtained in the animal kingdom, and so we have the conviction necessary to be acquired before we examine the phenomena; and then we make that investigation so as to reconcile the facts with the supposed universal laws of matter and motion. I do not exaggerate in the least. Here is what he says: "Only when the process of evolution of organisms is affiliated on the process of evolution in general can it be truly said to be explained. The thing required is to show that its various results are corollaries from first principles. We have to reconcile the facts with the universal laws of the redistribution of matter and motion." * What would Bacon have thought of this method of establishing the probable truth of a theory? It leaves out of consideration a multitude of facts, and one of them at least is of the utmost importance. It is that in the domain of animated matter, in organized beings, and most signally in the animal kingdom, there is a principle of life; and, whatever may be the universal laws of the redistribution of matter and motion, in their operation upon or among the products which are not endowed with this principle, when we come to reason about products that *are* endowed with it we are not entitled to conclude that this principle of animal life is itself a product of the operation of those laws because they have resulted in products which do not possess life, or life of the same kind. In order to reach the conviction that animal organisms have resulted solely from the operation of the laws of matter and motion, we must not undertake to reconcile the facts with those laws, but we must have some evidence that those laws have produced

* "Biology," i, pp. 409, 410.

living beings with complex and diversified organisms, and this evidence must at least tend to exclude every other hypothesis. It is not enough to flout at all other hypotheses, or to pronounce them *ex cathedra* to be idle tales.

KOSMICOS. You must not catch at single expressions and make yourself a captious critic. That would be unworthy of such an inquirer as you profess to be, and as I believe you are. Mr. Spencer did not mean, by reconciling the facts with the laws of matter and motion, that we are to distort the facts. He meant that we are to discover the correspondence between the facts and the operation of those laws. Now, let me show you more explicitly that he is quite right. There are certain laws of matter and motion, discoverable and discovered by scientific investigation, which prevail throughout all Nature. The phenomena which they produce, although not yet fully understood, justify the assumption of their universality and their modes of operation. It is perfectly legitimate, therefore, to reason that the same laws which have produced the observable phenomena in other departments of Nature have had a like potency as causes by which the phenomena in the animal kingdom have been produced. Using this legitimate mode of reasoning, Mr. Spencer traces the operation of those laws upon the primal molecules, which are peculiarly sensitive to their effects. He follows them through the successive aggregations of higher combinations until he arrives at the protoplasmic substance, out of which, from its capability of assuming an infinity of forms, aided by the environing conditions, the simplest organic forms become evolved, and thus what you call the principle of life gradually arose through a vast extent of time. He is therefore perfectly consistent with himself in denying the absolute commencement of organic life on the globe ; for you must understand that he means by this to deny that there was any point of time, or any particular organism, at or in which animal life

can be said to have had its first commencement, without having been preceded by some other kind of being, out of which the more highly organized being has been produced by modifications wrought by insensible gradations. If you will attend closely to his reasoning, you will see that you have small cause for criticising it as you have ; and, if you will look at one of his illustrations, you will see the strength of his position. Hear what he says : "It is no more needful to suppose an absolute commencement of organic life or a 'first organism' than it is needful to suppose an absolute commencement of social life and a first social organism. The assumption of such a necessity in this last case, made by early speculators with their theories of 'social contracts' and the like, is disproved by the facts ; and the facts, so far as they are ascertained, disprove the assumption of such a necessity in the first case." * That is to say, as the social facts, the social phenomena, disprove the "social contract" as an occurrence taking place by human design and intention, so the phenomena of animal life disprove the assumption of such an occurrence as its commencement by divine intervention, or its commencement at all.

SOPHEREUS. I think I understood all this before, just as you put it, but I am not the less obliged to you for the restatement. In regard to society, I know not why the family, the institution of marriage, is not to be regarded as the first social organism, and the union of two or more families in some kind of mutual league is certainly the first society in a more comprehensive sense. I care very little about the theory of the social contract, as applied to more complex societies, although, as a kind of legal fiction, it is well enough for all the uses which sound reasoners nowadays make of it. But the institution of marriage, the

* "Biology," i, p. 482.

family, is no fiction at all ; it is a fact, however it was first established, and it was the absolute commencement of social life. But I do not hold to this sort of analogies, or to this mode of reasoning from what happens in a department, in which the actions of men have largely or exclusively influenced the complex phenomena, to a department in which human influence has had nothing to do with the phenomena. But now let us come back to the proposition that there never was any absolute commencement of organic life on the globe. I will take Mr. Spencer's meaning—his denial, as you put it—and will test it by one or two observations upon his own explanation, as given in the elaborate paper in which he replied to a critic in the "North American Review" a little more than four years ago.* In the first place, then, as to time. It will not do to say that there never was a time when such a product as life, animated or organized life, had its first existence. To whatever it owed its existence, it must at some time have begun to exist. It matters not how far back in the ages of the globe you place it : you must contemplate a time when it did not exist, and a point of time at which it began to exist. It matters not that you can not fix this time. There was such a time, whether you can fix it chronologically or not. In the next place, however minute the supposed gradations which you trace backward from a recognizable organism to the primal protoplasmic substance, out of which you suppose it to have been gradually evolved, and through whatever extent of time you imagine these gradations to have been worked out by the operation of the forces of Nature, modifying successive beings, you must find an organism to which you can attribute life. Whatever that organism was, it was the commencement of organic life ; for, when you go back of it in the series, you come to something that was

* Now contained in "Biology," i, Appendix.

not organic life, but was merely a collection of molecules or a product of aggregated molecules, that had a capacity to be developed into an animated organism under favorable conditions. "It is," says Mr. Spencer, "by the action of the successively higher forms on one another, joined with the action of environing conditions, that the highest forms are reached." Some one, then, of those highest forms, something that can be called an animal organism, some being endowed with life, was the commencement of organic life on the globe; and it is just as correct and necessary to speak of it as the "absolute" commencement as it is when we speak of Darwin's aquatic grub, or of the Mosaic account of the creation of the different animals by the hand and will of God. Neither Mr. Spencer nor any other man can construct a chain of animated existence back into the region of its non-existence without showing that it began to have an existence. He can say that the affirmation of universal evolution is in itself a negation of an absolute commencement of anything. And so it is theoretically. But this does not get over the difficulty. On his own explanation of the mode in which organisms have been evolved, there must have been a first organism, and in that first organism life began. So that I am not yet prepared to yield my criticism, or to yield my convictions to a writer who is so much carried away by his theory.

KOSMICOS. But you will allow that the theory is perfect in itself; and why, then, do you say that he is carried away by it? You ought either to give up your criticism, or to show that there is a superior hypothesis by which to account for the origin of organisms, and one that is supported by stronger proofs and better reasoning. You have nothing to oppose to Mr. Spencer's explanation of the origin of organic life, excepting the fable which you find in the book of Genesis.

SOPHEREUS. Undoubtedly the opposite hypothesis is that

which attributes to a Creator the production of organic life ; and whether the Mosaic account, as it stands, be a fable or a true narrative of an actual occurrence, what we have to do is to ascertain, upon correct principles of reasoning, whether the creating power can be dispensed with. Mr. Spencer dispenses with it altogether. He gives it a direct negative in the most absolute manner. But the perfection of his theory depends upon its ability to sustain itself as an explanation of the existence of organisms without the intervention of a creating power anywhere at any time. I have already suggested the serious defect of his whole philosophic scheme as applied to the existence of organisms, namely, that the foundation of the theory, the existence of the molecules with their properties and capacities tending to rearrangement under the laws of matter and motion, those laws themselves, and the environing conditions which assist the process of adjustment and combination, must all have had an origin, or a cause. If we can get along without that origin, without any cause, without any actor laying the foundations of the world, we can make a theory. But that theory can not sustain itself by such a negation if all experience, observation, and reflection amount to anything ; for these all point in one direction. They all tend to show that every existing thing must have had a cause, that every product must have had an origin, and, if we place that origin in the operation of certain laws of matter and motion upon and among the primal molecules of matter, we still have to look for the origin of those laws and of the molecules on which they have operated. If we say that these things had no origin, that they existed without having been caused to exist, we end in a negation at which reason at once rebels. If, on the other hand, we reject, as we must reject, this negation, then the same power which could establish the laws of matter and motion, and give origin to the molecules and the favoring conditions by which

their aggregated higher forms are supposed to have been developed, was alike capable of the direct production of species, the creation of the sexes, and the establishment of the laws of procreation and gestation. So that it becomes a question of probability, of the weight of evidence, as to whether we can explain the phenomena of species, of the sexual division and the sexual union, with all that they involve, without the hypothesis of direct intervention, design, and formative skill of a boundless character. I have seen no explanation of the origin of species and of the sexual distinction, with its concomitant methods of reproduction, that does not end in an utter blank, whenever it undertakes to dispense with that kind of direct design to which is derisively given the name of "miraculous interposition," but which in truth implies no miracle at all.

KOSMICOS. I have to be perpetually recalling you to the first principles of Mr. Spencer's philosophy. You seem to think it enough to point to the existence of species and the sexual division, as if his philosophy did not afford the means of accounting for them by the operation of natural causes. Let me put to you, then, this question: If natural causes have produced a crystal, by successive new combinations of molecules of matter through gradations rising successively into higher forms, why should not natural causes, acting upon other molecules in a corresponding way, have produced organic life, or animated organisms? If natural causes have evolved out of certain molecules the substance known as organizable protein, why should not the continued operation of the same or similar causes have modified organizable protein into some distinct and recognizable animated organism? If you admit this as a possible or highly probable result, why should not natural causes have produced, in the course of millions of years, the division of the sexes and the methods of procreation and multiplication?

SOPHEREUS. I will assign the reasons for not adopting the conclusions to which you expect me to arrive, in a certain order. In the first place, the capacity of certain molecules to result in the formation of a crystal, under the operation of what you call natural causes, requires that the molecules, their capacity, and the natural causes should all have had an origin, call it known or unknown. The cause was of equal potency to produce the crystal directly, or anything else that exists in Nature. The same thing is true of certain other molecules which, under the operation of the so-called natural causes, have resulted in organizable protein. There must have been an origin to the molecules, to their capacity, and to the laws which effect their combinations; and this cause could equally fashion an organism and fashion it in the related forms of male and female by direct intervention, for to such a power there is no assignable limit. In the next place, the distinction between inanimate and animated matter, between beings endowed and beings not endowed with animal life, is a distinction that can not be overlooked; for, although we find this distinction to be a fact that has resulted after the operation of whatever causes may have produced it, we must still note that there is a distinction, and a very important one. It may be that the dividing line is very difficult of detection; that it is impossible to determine in all cases just where organizable matter passes from dead matter into a living organism. But that at some point there has arisen a living organism, however produced, is certain. Now, suppose that what you call natural causes have operated to bring organizable matter up to this dividing line, the question is, whether we can conclude that they have had the potency to pass that line, and to lead of themselves to all the varying and manifold results of species, the division of the sexes, and all that follows that division. Certain great facts seem to me to negative this conclusion. The first is, that

we have species, which differ absolutely from each other as organisms, in their modes of life, and their destinies, however strong may be the resemblances which obtain among them in certain respects. The second fact is, that each of the true species is divided into the related forms of male and female, and is placed under a law of procreation, by the sexual union, for the multiplication of individuals of that species. The third fact is, that no crosses take place in Nature between different species of animals—between the true species—resulting in a third species, or a third animal. It is true that multiplication of individuals of some of the lowest organisms takes place without the bisexual process of procreation, as where, in the severance of a part of an organism the severed part grows, under favorable conditions, into a perfect organism of the same kind, as in the analogous phenomenon of a plant propagated by a branch or a slip from the parent stem. But this occurrence does not take place among the animals which are placed for their multiplication under the law of the sexual union and the sexual procreation. The sexual division, therefore, the law of sexual procreation, and all that they involve, have to be accounted for. Can they be accounted for by the theory of evolution? Wherever you place their first occurrence, you have to find a process adequate to their production. What, then, entitles you to say that the hypothesis of their production, by the capacity and tendency of organizable substances, when they have reached certain combinations, is superior to the hypothesis of a direct interposition and a formative will? At the outset, you must begin with some interposition and some formative will; you must account for the existence of the very capacities of matter to become organized under the laws of the redistribution of matter and motion, or you will end nowhere whatever. If you assume, as you must, that, in laying “the foundations of the world,” there was exercised some interposition and some

formative will, you have a power which was just as adequate to the production of species, and their sexual division, as it was to the endowment of matter with certain properties and capacities, and the establishment of any laws for the redistribution of matter and motion. If you deny the existence and potency of the original power in the one production you must deny them in the other. If you concede them in the one case, you must concede them in the other. Now, although the original power was equal to the endowment of organizable matter with its capacities for and tendencies to organization, and may be theoretically assumed to have made that endowment, the question is, whether these capacities and tendencies, without special formative interposition, and by the mere force of what you call natural causes, were equal to the production of such phenomena as the division of the sexes and all that follows that division. Can it with any truth be said that the so-called natural causes have produced any phenomena which can be compared, on the question of special design, to the phenomena of the sexual division, the law of sexual procreation, and the whole system of the multiplication of individuals of distinct and true species? When I can see any facts which will warrant the belief that the origin of the sexes is to be attributed to the capacity of organizable protein to form itself into new compounds, to the capacity of these new compounds to become living organisms, and to the capacity of these living organisms, without the intervention of any formative will specially designing the result, to divide themselves into related forms of male and female, to establish for themselves the law of procreation, and to limit that procreation to the same species, I shall, perhaps, begin to see some ground for the superior claims of the evolution hypothesis. I should like, by-the-by, to see a system of classification of animal organisms, based exclusively on the distinction between the bisexual and the uni-

sexual, or the non-sexual, methods of reproduction, and without running it out into the analogies of the vegetable world. I fancy that it would be found extremely difficult to account for the bisexual division without reaching the conclusion that it required and was effected by a special interposition. At all events, I should like to see it explained how the asexual and the unisexual construction passed into the bisexual by the mere operation of what you call natural causes.

KOSMICOS. You said, a while ago, that you had never learned any nursery-stories. Yet, all along, you seem to me to have been under the influence of the Mosaic account of the creation. Of course you have read it, and, although you did not learn anything about it in childhood, and now try to treat it solely as a hypothesis, without any regard to its claims as a divinely inspired narrative, it is certainly worth your while to see how completely it becomes an idle tale of the nursery when scientific tests are applied to it. Hear what Spencer says about the creation of man, as given by Moses: "The old Hebrew idea that God takes clay and molds a new creature, as a potter might mold a vessel, is probably too grossly anthropomorphic to be accepted by any modern defender of special creations."

SOPHEREUS. Let us see about this. Let us discard all idea of the source from which Moses received his information of the occurrences which he relates, and put his account upon the same level with Plato's description of the origin of animals, and with the Darwinian or Spencerian theory of that origin; regarding all three of them, that is to say, as mere hypotheses. Whatever may be the supposed conflict between the Mosaic account of the creation and the conclusions of geologists concerning the periods during which the earth may have become formed as we now find it, the question is, on the one hand, whether the Hebrew historian's account of the process of creation is a concep-

tion substantially the same as that at which we should have arrived from a study of Nature if we had never had that account transmitted to us from a period when the traditions of mankind were taking the shapes in which they have reached us from different sources ; or whether, on the other hand, it is so “ grossly anthropomorphic ” and absurd that it is not worthy of any consideration as an occurrence that it will bear the slightest test of scientific scrutiny. Let any one take the Mosaic narrative, and, divesting himself of all influence of supposed inspiration or divine authority speaking through the chosen servant of God, and disregarding the meaning of those obscure statements which divide the stages of the work into the first and the second “ day,” etc., let him follow out the order in which the Creator is said by Moses to have acted. He will find in the narrative an immense condensation, highly figurative expressions, and many elliptical passages. But he will also find that the Creator is described as proceeding in the exertion of his omnipotent power in a manner which we should be very likely to deduce from a study of his works without this narrative. We have, first, the reduction of the earth from its chaotic condition—“ without form and void ”—to the separation of its elemental substances ; then the creation of light ; the separation of earth and water ; the productive capacity of the dry land ; the establishment of the vegetable kingdom, each product “ after its kind ” ; the formation of the heavenly bodies as lights in the firmament, to make the division of day and night, seasons and years. It is obviously immaterial, so far as this order of the work is concerned, down to the stage when the formation of the first animals took place, in what length of time this first stage of the work was accomplished ; whether it was done by an Omnipotence that could speak things into existence by a word, or whether the process was carried on through periods of time of which we can have no measure, and by

the operation of infinitely slow-moving agencies selected and employed for the accomplishment of a certain result. Confining our attention to the first stage of the work as we find it described, we have the formation of the earth, light, air, the heavenly bodies, alternations of day and night, seasons and years, and the vegetable kingdom, before any animal creation. We then come to the formation of animals which are to inhabit this convenient abode, and which are described as taking place in the following order : first the water animals, the fowls of the air, and the beasts of the field, "each after its kind"; then, and finally, the creation of man. Respecting his creation, we are told that it was the purpose of the Almighty to make a being after a very different "image" from that of any other creature on the earth; and whatever may be the true interpretation of the language employed, whether man was created literally "in our image, after our likeness," or according to an image and a likeness of which his Creator had conceived, there can be no doubt that what Moses described as the purpose of God was to make a being differing absolutely from all the other animals by a broad line of demarkation which is perfectly discoverable through all the resemblances that obtain between him and all the other living creatures. To this new being there was given, we are told, dominion over all the other animals, and the fruits of the earth were assigned to him for food; he was formed out of the dust of the earth, the breath of life was breathed into his nostrils, and he became "a living soul." Let us now see if this statement of the creation of man is so "grossly anthropomorphic" as is supposed. You are aware that Buffon, who was certainly no mean naturalist or philosopher, and who was uninfluenced by the idea that the book of Genesis was an inspired production, reached the conclusion that a study of nature renders the order of man's creation as described by Moses a substantially true hypothesis. "We are persuaded," said

Buffon, "independently of the authority of the sacred books, that man was created last, and that he only came to wield the scepter of the earth when that earth was found worthy of his sway."* You evolutionists will say that this may be very true upon your hypothesis of his gradual development out of other animals, through untold periods of time. But now let us see whether Moses was so grossly unscientific, upon the supposition that God created man as he describes. If man was created, or molded, by the Deity, he was formed, in his physical structure, out of matter ; and all matter may be figuratively and even scientifically described as "the dust of the earth," or as "clay," or by any other term that will give an idea of a substance that was not spirit. If Moses had said that man's body was formed out of the constituent elements of matter, or some of them, he would have said nothing that a modern believer in special creations need shrink from, for he would have stated an indisputable fact. He stated in one form of expression the very same fact that a modern scientist would have to state in another form, whatever might have been the mode, or the power, or the time in or by which the constituent elements were brought together and molded into the human body. So that the derisive figure of God taking clay and molding it into the human form, as a potter would mold a vessel, does not strike me as presenting any proof that the account given by Moses is so destitute of scientific accuracy, or as rendering his statements a ridiculous hypothesis.

KOSMICOS. Well, then, it comes at last to this : that you consider the substance of the Mosaic account of the creation, independent of its authority as an inspired statement, to be

* Quoted by M. Guizot in his "History of France," vol. vi, p. 323. Guizot observes that Buffon was "absolutely unshackled by any religious prejudice," and that he "involuntarily recurred to the account given in Genesis."

entitled to stand as a hypothesis against the explanations given to us by the scientists of the great modern school of evolution, notwithstanding those explanations are in one form or another now accepted by the most advanced scientific thinkers and explorers?

SOPHEREUS. I certainly do. But understand me explicitly. As, after my study of the probable origin of the solar system, and our discussion of that subject, I expressed my conclusion that the phenomena called for and manifested the exercise of a formative will by some acts of special creation, so now, in reference to the animal kingdom, I have reached the same conclusion, for reasons which I have endeavored to assign. I can see that the operation of the process which you call evolution may have caused certain limited modifications in the structure and habits of life of different animals; or rather, that limited modifications of structure and habits of life have occurred, and hence you deduce what you call the process of evolution. But to me this entirely fails to account for, or to suggest a rational explanation of, the distinct existence of species, their division into male and female, and the establishment of the laws of procreation by which individuals of a species are multiplied—a process which does not admit of the production of individuals of an essentially different type from the parents, and which, so far as we have any means of knowledge, has never commenced in one species and ended in another, in any length of time that can be imagined, or through any series of modifications.

KOSMICOS. Let us postpone the farther discussion of the origin of species to some future time, when I will endeavor to convince you that both Darwin and Spencer have satisfactorily accounted for them.

SOPHEREUS. Very well; I shall be glad to be enlightened.

THE SINGLE-CELL HYPOTHESIS.

NOTE.—It will readily occur to the reader that Sophereus might most pertinently have asked: Whence did the primal cell originate? It is conceived of as the ultimate unit of organizable matter; invisible to the naked eye, perhaps incapable of being reached by the microscope, but consisting of an infinitesimally small portion of matter, more or less organized in itself, and possessing a capacity to unite with itself other minute particles of matter, and so to form larger aggregates of molecules. The hypothesis is, that this single cell has given origin to all animated organisms, and, through an indefinite series of such organisms, to the human race. The single cell, then, having this capacity and this extraordinary destiny, was either the first and only one of its kind, or it was one of many of the same kind. If we select any supposed point of time in the far antecedent history of matter, the question may be asked whether there existed at first but one such cell, or many. If there were many of such cells, how came they to exist? If one only was selected out of many, for this extraordinary destiny of giving origin to all the animated organisms, who or what made the selection for this transcendent office of the one cell? If there never was but one such cell, how did it come to exist? As these questions are clearly pertinent, the effort to answer them inevitably conducts us to the idea of creation, or else to the conclusion that the numerous cells and the selected one had no origin; that the selection was not made, but was accidental; or that the one cell, if there never was but one, was not a created thing. Human reason can not accept this conclusion.

CHAPTER X.

"Species," "races," and "varieties"—Sexual division—Causation.

THE two friendly disputants have again met. Sosphereus begins their further colloquy, in an effort to reach a common understanding of certain terms, so that they may not be speaking of different things.

SOPHEREUS. I have more than once referred to the fact that Nature does not permit crosses between the true species of animals, in breeding, and that we have no reason to suppose it ever did. This is a very important fact to be considered in weighing the claims of your theory of evolution. I have been looking into Darwin, and I find it somewhat uncertain in what sense he uses the terms "species," "races," and "varieties." In his "Descent of Man," he devotes a good deal of space to the discussion of the various classifications made by different naturalists under these respective terms; and there is no small danger of confusion arising from the use of these terms unless they are defined. The possibility of the process of evolution, as a means of accounting for the existence of any known animal, depends in some degree upon the animals among which, by sexual generation, the supposed transition from one kind of animal to another kind has taken place. Darwin speaks of the difficulty of defining "species"; and yet it is obvious (is it not?) that the theory of the graduation of different forms into one another depends for its possibility upon the forms which have admitted of interbreeding. While, therefore, the term "species" is in one sense arbitrary, as

used by different naturalists, and there is no definition of it common to them all, it is still necessary to have a clear idea of the limits within which crosses can take place in breeding, because there are such limits in nature. Thus, in the case of man, as known to us in history and by observation, there are different families, which are classed as "races." Darwin speaks of the weighty arguments which naturalists have, or may have, for "raising the *races* of man to the dignity of *species*." Whether this would be anything more than a matter of scientific nomenclature, is perhaps unnecessary to consider. Whether we call the "races" of men "species," or speak of them as families of one race, we know as a fact that interbreeding can take place among them all, and that between man and any other animal it can not take place. The same thing is true of the equine and the bovine races and their several varieties. Whether, in speaking of the different families or races of men, we consider them all as one "species," or as different species—and so of the varieties of the equine or the bovine races—the important fact is, that there are limits within which interbreeding can take place, and out of which it can not take place. Do you admit or deny that the barriers against sexual generation between animals of essentially different types, which are established in nature, are important facts in judging of the hypothesis of animal evolution?

KOSMICOS. Take care that you have an accurate idea of what the theory of evolution is. Apply it, for example, to the origin of man, as an animal, proceeding "by a series of forms graduating insensibly from some ape-like creature to man as he now exists." This expresses the whole theory as applied to one animal, man, without going behind his ape-like progenitors. It does not suppose a crossing between the ape-like creature and some other creature that was not an ape. It supposes a gradual development of the ape-like creature into the man as he now exists; and, of course, the

interbreeding took place between the males and the females of that ape-like race and their descendants—the descendants, through a long series of forms, being gradually modified into men, by the operation of the laws of natural and sexual selection, which I need not again explain to you.

SOPHEREUS. Very well, I have always so understood the theory. But then I have also understood it to be a part of the same theory that there is important auxiliary proof of the supposed process of evolution to be derived from what is known to take place in the interbreeding of different races or families of the same animal. Whatever value there may be in this last fact, as auxiliary evidence of the supposed process of evolution, there must have been a time, in the development of the long series of forms proceeding from the ape-like progenitor, when an animal had been produced which could propagate nothing but its own type, and between which and the surrounding other animals no propagation could take place, if we are to judge by what all nature teaches us. You may say that the laws of natural and sexual selection would still go on operating among the numerous individuals of this animal which had become in itself a completed product, and that to their descendants would be transmitted newly acquired organs and powers, new habits of life, and all else that natural and sexual selection can be imagined to have brought about. But at some time, somewhere in the series, you reach an animal of a distinct character, in which natural and sexual selection have done all that they can do; in which there can be no propagation of offspring but those of a distinct and peculiar type, and the invincible barrier against a sexual union with any other type becomes established. For this reason, we must recognize the limits of possible interbreeding. It is best for us, therefore, to come to some understanding of the sense in which we shall use the term “species.” For I shall press upon you this consideration—that animals dif-

fer absolutely from each other; that there can be no interbreeding between animals which so differ; and yet that, without interbreeding between animals having distinct organizations, natural and sexual selection had not the force necessary to produce, in any length of time, such a being as man out of such a being as the ape.

KOSMICOS. I will let Darwin answer you, in a passage which I will read. "Whether primeval man," he observes, "when he possessed but few arts, and those of the rudest kind, and when his power of language was extremely imperfect, would have deserved to be called man, must depend on the definition which we employ. In a long series of forms graduating insensibly from some ape-like creature to man as he now exists, it would be impossible to fix on any definite time when the term 'man' ought to be used. But this is a matter of very little importance." That is to say, in the long series of forms descending from the ape-like creature, we can not fix on any one of the modified descendants which we can pronounce to be separated from the family of apes, and to have become the new family, man, because to do this requires a definition of man. Man as he now exists we know, but the primeval man we do not know. He may have been an animal capable of sexual union with some of his kindred who stood nearest to him, but yet remained apes, or he may not. It is not important what he was, or whether we can find the time when he ceased to belong to the family of apes and became the primeval man. The hypothesis of his descent remains good, notwithstanding we can not find that time, because it is supported by a great multitude of facts.

SOPHEREUS. I have never seen any facts which I can regard as giving direct support to the theory. But, waiving this want of evidence, doubtless it is not important to find the time, chronologically, when the modified descendants, supposed to have proceeded from the ape-like creature,

became the primeval man ; but it is of the utmost importance to have some satisfactory grounds for believing that there ever was such an occurrence as the development of the animal man, primeval or modern man, out of such an animal as the ape. And therefore, without reference to the sense in which naturalists use the term "species," I shall give you the sense in which I use it. I use it to designate the animals which are distinct from each other, as the man, the horse, the ape, and the dog are all distinct from each other. Speaking of man as one true species, I include all the races of men. Speaking of the apes as another species, I include all the families of apes. Speaking of the bovine, the equine, or the canine species, I include in each their respective varieties. Now, as crosses in interbreeding can take place between the different varieties or families of these several species, and can not take place between the species themselves—between those which I thus class as species—the limits of such crosses become important facts in considering the theory of evolution, because they narrow the inquiry to the possibility of effecting a propagation of one species out of another species. Take any animal which has become a completed and final product—a peculiar and distinct creature—whether made so by aboriginal creation or produced by what you call evolution. The reproductive faculty of the males and the females of this distinct and peculiar animal is limited to the generative reproduction of individuals of the same type, by a sexual union of two individuals of that type. Their progeny, in successive generations, may be marked by adventitious and slowly acquired peculiarities ; but unless there can be found some instance or instances in which the process of modification has resulted in an animal which we must regard as an essentially new creature—a new species—what becomes of the auxiliary evidence which is supposed to be derived from the effects of interbreeding between

those individuals which can interbreed? I lose all hold upon the theory of evolution, unless I can have some proof that natural and sexual selection have overcome the barriers against a sexual union among animals which are divided into males and females of the several species, each of which is placed under a law of procreation and gestation peculiar to itself, and never produces any type but its own.

KOSMICOS. You wander from the principle of evolution. I have to be perpetually restating it. Observe, then, that there are multitudes of facts which warrant the belief that, starting with any one kind of animal organism, however peculiar and distinct, the struggle for existence among the enormous number of individuals of that animal becomes most intense, and a furious battle is constantly going on. The best-appointed males, in the fierceness of the strife for possession of the females, develop new organs and powers, or their original organs and powers are greatly enhanced. Their descendants share in these modifications; and the modifications go on in a geometrical ratio of increase through millions of years, until at some time there is developed an animal which differs absolutely from its remote progenitors which were away back in the remote past, and which began the struggle for individual life and the continuation of their species or their race in a condition of things which left the fittest survivors the sole or nearly the sole propagators of new individuals. This struggle for existence may have begun—probably it did begin—before the separation of the sexes, when the organism was unisexual or even asexual. That is to say, there may have been, and there probably was, an organism which multiplied with enormous rapidity, without the bisexual method of reproduction. The vast multitude of such individuals would lead to the destruction of the weakest; the strong survivors would continue to give rise to other individuals, modified from the original type, until at length, by force of this per-

petual exertion and struggle and the survival of the fittest, modifications of the method of reproduction would ensue, and the bisexual division would be developed and perpetuated.

SOPHEREUS. I confess I did not expect to hear you go quite so far. I will yield all the potency to natural and sexual selection that can be fairly claimed for them as modifying agencies operating after the sexual division has come about ; but I have, I repeat, seen no facts which justify the hypothesis that they have led to distinct organisms between which no propagation can take place. But now you expect me to accept the startling conclusion that at some time the asexual or the unisexual method of reproduction passed into the bisexual, without any formative will or design of a creating power, and without any act of direct creation. We know what Plato imagined as the origin of the sexual division, and that he could not get along without the intervention of the gods. What modern naturalist has done any better ? I have examined Darwin's works pretty diligently, and I can not get from them any solution of the origin of the bisexual division. I am left to reason upon it as I best can. We know, then, that in the higher animal organisms the individuals of each species are divided into the related forms of male and female, and that for each species there exists the one invariable method of the sexual union, and a law of gestation peculiar to itself. One hypothesis is that this system was produced by the operation of natural causes, like those which are supposed to have differentiated the various kinds of organisms; the other hypothesis is that it was introduced with special design, by an act of some creative will. If we view the phenomena of the sexual division and the sexual genesis in the highest animal in which they obtain, we find that they lead to certain social results, which plainly indicate that in this animal they exist for a great and comprehensive moral

purpose, which far transcends all that can be imagined as the moral purpose for which they exist in the other animals. To a comparatively very limited extent, certain social consequences flow from the law of sexual division and genesis among the other animals. But there is no animal in which the moral and social effects of this law are to be compared to those which it produces in the human race. Not only does the same law of multiplication obtain among the human race ; not only does it lead to love of the offspring far more durable and powerful than in the case of any other animal ; not only is it the origin of a society far more complex, more lasting, and more varied in its conditions than any that can be discovered in the associations of other animals which appear to have some social habits and to form themselves into communities, but in the human race alone, so far as we have any means of knowledge, has the passion of sexual love become refined into a sentiment. You may remember the passage in the "Paradise Lost" in which Raphael, in his conversation with Adam, touches so finely the distinction between sexual love in the human race and in all the other animals. The angel reminds Adam that he shares with the brutes the physical enjoyment which leads to propagation ; and then tells him that there was implanted in his nature a higher and different capacity of enjoyment in love. The conclusion is :—

" . . . for this cause

Among the beasts no mate for thee was found."

In the human being alone, even when there is not much else to distinguish the savage from the beasts around him, the passion of love is often something more nearly akin to what might be looked for in an elevated nature, than it can be among the brutes. What do the poetry and romance of the ruder nations show, but that this passion of sexual love in the human being is one in which physical appetite

and sentimental feeling are so "well commingled" that their union marks the compound nature of an animal and a spiritual being? How human society has resulted from this passion, how in the great aggregate of its forces it moves the world, how in its highest development it gives rise to the social virtues, and in its baser manifestations leads to vice, misery, and degradation, I do not need to remind you. How, then, is it possible to avoid the conclusion that in man the sexual passion was implanted by special design and for a special purpose, which extends far beyond the immediate end of a continuation of the race?

KOSMICOS. Why do you resort to a special purpose in the constitution of one animal, and to the absence of a similar purpose from the constitution of another animal? In both, the consequences make a case of the *post hoc* just as plainly as they make a case of the *propter hoc*. It is just as rational to conclude that they only show the former as it is to conclude that they establish the latter. In man, we have the physical fact of the sexual division, and all you can say is that it is followed by certain great and varied moral phenomena. In the other animals, we have the same physical fact, followed by moral phenomena less complex and varied, and not so lasting. In neither case can you say that there was a special and separate design, according to which the same physical fact was intended to produce the special consequences which we observe in each. Why, as the species called man became developed into beings of a higher order than the primates of the race or than their remote progenitors, should not this passion of sexual love have become elevated into a sentiment and been followed by the effects of that elevation, just as the gratification of another appetite, that for food, *par exemple*, has been refined by the intellectual pleasures of the social banquet and the interchange of social courtesies? Is there anything to be proved by the institution or the practice of

marriage, beyond this—that it has been found by experience to be of great social utility, and is therefore regulated by human laws and customs, which vary in the different races of mankind? Monogamy is the rule among some nations, polygamy is at least allowed in others. You can predicate nothing of either excepting that each society deems its own practice to be upon the whole the most advantageous. You can not say that there is any fixed law of nature which renders it unnatural for one man to have more than one wife. In many ages of the world there have been states of society in which the family has had as good a foundation in polygamous as it has had in monogamous unions. Looking, then, at these undeniable facts, and also at the fact that marriage, whether monogamous or polygamous, is an institution regulated by human law and custom, we have to inquire for the reason why human law and custom take any cognizance of the relation. We find that, among some of the other animals, the sexes do not pair excepting for a single birth. The connection lasts no longer than for a certain period during which the protection of both parents is needed by the offspring, and not always so long even as that. It has become the experience of mankind that the connection of the parents ought to be formed for more than one birth; shall be of indefinite duration; and this because of the physical and social benefits which flow from such a permanency of the union. This has given rise to certain moral feelings concerning the relation of husband and wife. But we have no more warrant, from anything that we can discover in nature, for regarding the permanency of marriage among the human race as a divine institution than we have for regarding its temporary continuance among the other animals as a divinely appointed temporary arrangement. In the one case, the permanency of the union has resulted from experience of its utility. In the other case, the animal perceives no such

utility, and therefore does not follow the practice. Upon the hypothesis that all the animals, man included, had a common origin, it is very easy to account for the difference which prevails between man and the other animals in this matter of marriage, or the pairing of the sexes. As man became by insensible gradations evolved out of some pre-existing organism, and as moral sentiments became evolved out of his superior and more complex relations with his fellows, from his experience of the practical utility of certain kinds of conduct and practice, the sentiments became insensibly interwoven with his feelings about the most important of his social relations, the union of the sexes in marriage. This is quite sufficient to account for the difference between man and the other animals in regard to the duration of such unions, without resorting to any intentional or divine or superhuman origin of that difference.

SOPHEREUS. For the purpose of the argument, I concede that this is a case of either the *post hoc* or the *propter hoc*. I have been pretty careful, however, in all my investigations, not to lose sight of this distinction in reasoning on the phenomena of nature or those of society. I think I can perceive when there is a connection between cause and effect, when that connection evinces an intelligent design, and when the phenomena bear no relation to a certain fact beyond that of sequence in time. What, then, have we to begin with? We have the fact that the human race is divided into the two forms of male and female, and that the passion or appetite of sexual love exists in both sexes, and that its gratification is the immediate cause of a production of other individuals of the same species. We next have the fact that this union of the sexes is followed by an extraordinary amount of moral and social phenomena that are peculiar to the human race. This sequence proves to me an intentional design that the moral and social phenomena shall flow from the occurrence of the sexual union, for it

establishes not only a possibility, but an immensely strong probability, that the phenomena were designed to flow from this one occurrence among this particular species of animal. If this connection between the original physiological fact and the moral and social phenomena be established to our reasonable satisfaction, it is the highest kind of moral evidence of a special design in the existence of the sexual division and the sexual passion among the human race. You remember old Sir Thomas Browne's suggestion, that men might have been propagated as trees are. But they are not so propagated. If they were, no such consequences would have followed as those which do follow from the mode in which they are in fact propagated. These consequences are most numerous and complex, and they are capable of being assigned to nothing but the sexual division and the sexual union as the means of continuing the race. Turn now to some of the other animals among whom there prevail the same bisexual division and the same method of procreation and multiplication. You find they result in sexual unions of very short duration, and that, if it is followed by phenomena that in some feeble degree resemble those which are found in human society, they bear no comparison in point of complexity and character to those which in the human race mark the family, the tribe, and the nation. And here there occurs something which is closely analogous to what I pointed out to you in considering the supposed development of the first animal organism. I said that although you may theoretically suppose that the first animal organism was formed by the spontaneous union of molecular aggregates, and that the higher organisms were evolved out of the lower solely by the operation of causes which you call "natural," yet that when you come to account for the existence of true and distinct species, each with its sexual division and its law of procreation and gestation, you must infer a special design and a formative will, because

there has never been suggested any method by which the so-called natural causes could have produced this division of the sexes and this invariable law of the sexual procreation among individuals of the same species. Here, then, we arrive at a distinct moral purpose; for, when we compare the different social phenomena which follow the operation of the sexual division and procreation in man with the social phenomena which follow in the case of the other animals, we find a difference that is not simply one of degree, but is one of kind. We find the origin of the family, the tribe, and the nation: the source of the complex phenomena of human society. We may therefore rationally conclude that in man the sexual division and the sexual passion were designed to have effects that they were not designed to have in the other animals. To suppose that these vastly superior consequences in the case of man are the mere results of his perception of their utility will not account for the fact that when he does not recognize the utility—when he departs from the law of his human existence—human society can not be formed and continued. Although it is possible for human society to exist with polygamous marriages, and even to have some strength and duration, yet human society without the family, with promiscuous sexual intercourse, with no marriages and no ties between parents and children, never has existed or can exist. Compare Plato's curious constitution of the body of "guardians," in his "Republic," and the strange method of unions, the offspring of which were not allowed to know their parents or the parents to know their own children. This was not imagined as a form of human society, but was entirely like a breeding-stud. Among the brutes, permanent marriages, families, do not exist, not because the animals do not perceive their social utility, but because the purposes of their lives, their manifest destinies, show that there was no reason for endowing them with any higher

capacity for the sexual enjoyment than that which leads to the very limited consequences for which the division of the sexes was in their cases ordained. But in the case of man there is a further and higher capacity for the sexual enjoyment, which becomes the root of his social happiness, and which distinguishes him from the brute creation quite as palpably as the superiority of his intellectual faculties. In all this we must recognize a moral purpose.

KOSMICOS. Pray tell me why it is not just as rational to conclude that these moral phenomena, as results of the human passion of love, have become, in all their complex and diversified aspects, the consequences of a progressive elevation of the human animal to a higher plane of existence than that occupied by the inferior species, or than that occupied by the primeval man. When man had become developed into an animal in whom the intellect could become what it is, he could begin to perceive the social utility of certain modes of life, and from this idea of their utility would result certain maxims of conduct which would be acted on as moral obligations. Thus, commencing with a consciousness that the race exists with the sexual division into male and female, there would begin to be formed some ideas of the superior social utility of a regulated sexual union of individuals and of permanent marriages. These ideas would become refined as the progressive elevation of the race went on, and that which we recognize as the sentimental element in the passion of love would become developed out of the perceptions of a superior utility in the permanent devotion and consecration of two individuals to each other. If, then, by a moral purpose in the establishment of the bisexual division you mean that all these social phenomena of the family, the tribe, and the nation were designed in the human race to follow from that division, I see no necessity for resorting to any such moral purpose on the part of a creator, because they might just as well have

followed from the progressive elevation and development of the human animal, supposing him to be descended from some pre-existing type of animal of another and inferior organization. The philosophy which you seem to be cultivating closely resembles that which ascribes everything to the action of mind as its cause. This, you must be aware, it is the tendency of modern science to antagonize by a different view of causation. What have you been reading, that you adhere so pertinaciously to the idea of a moral purpose adopted by some being, overlooking those physical causes which may have produced all the results without that hypothesis?

SOPHEREUS. I have been reading a good deal, but I have reflected more. I may not be able to reconcile the metaphysical speculations of the different schools of philosophy by explanations that will satisfy others, but I can satisfy myself on one point. This is, that power, force, energy, causation, are all attributes of mind, and can exist in a mind only. Let us pass for a moment from abstract reasoning to an illustration drawn from familiar objects. A ton of coal contains a certain amount of what is scientifically called energy. This energy becomes developed by combustion, which liberates heat. The heat, when applied to water, converts the water into a vapor called steam—a highly elastic substance. The expansion of the steam against a mechanical instrument called a piston produces motion, and an engine is driven. The force thus obtained represents the energy that was latent in the coal. If we inquire whence the coal obtained this latent energy, there is a hypothesis which assigns its origin to the sun, which laid up a certain quantity of it in the vegetable substances that became converted into coal in one of the geological periods of the earth's formation. But in order to find the ultimate and original cause—the *causa causans* of the whole process—we must go behind the steam and its

expansive quality, behind the heat which converts the water into steam, behind the coal and its combustible quality, and behind the sun and its indwelling heat, a portion of which was imparted to and left latent in the vegetable substances that became coal. We must inquire whence they all originated. If they did not create themselves—an inconceivable and inadmissible hypothesis—they must have originated in some creating power, which commanded them to exist and established their connections. Without a mental energy and its exertions, matter and all its properties, substance and all its qualities, the sun's indwelling heat and its capacity to be stored up in vegetable fiber in a latent condition, could not have existed, and the forces of nature of which we avail ourselves would never have emerged from the non-existent state that we conceive of as "chaos." I know very well that we are accustomed to associate with inanimate matter the ideas of power, force, energy, and causation. But if we rest in the conception of these as acting of themselves, and without being under the control of an originating mind or a determining will, we may think that we have arrived at ultimate causes, but we have not. We have arrived at subsidiary causes—the instruments, so to speak, in the control of an intellect which has ordained and uses them. Whether we look at the physical causes by which the early Greek philosophers endeavored to explain the phenomena of the universe, or at one of Plato's conceptions of a designing and volitional agency in the formation of the Kosmos, or to another of his conceptions, the sovereignty of universal ideas or metaphysical abstractions, we are everywhere confronted with the necessity for assigning an origin to the physical causes, or to the universal ideas; and the result is that the idea of a supreme, designing, and volitional agency is forced upon us—it is upon me—by an irresistible process of reasoning, an invincible necessity of my mental constitution. I can not agree with Auguste Comte,

who regards it as the natural progress of the human mind to explain phenomena at first by reference to some personal agency, and to pass from this mode of explanation to that by metaphysical abstractions. Nor can I agree with you scientists, who not only rest satisfied yourselves with the explanation of the ultimate cause of phenomena by mere physical agencies, but who insist that others shall not deduce a personal and volitional agency from the existence of those physical agencies. To me it seems indispensable, in the study of phenomena, to recognize moral purposes for which they have been made to be what they are : and of course a moral purpose is not assignable to the physical agencies of matter, or to metaphysical abstractions. Hence it is that in reasoning on the phenomena of human society, I am obliged to recognize a moral purpose in the sexual division, of far greater scope and far more varied consequences than can be found in the case of the same division among the other animals.

KOSMICOS. I put to you this question : What do you mean by a moral purpose ? In teleology, or the science of the final causes of things, you must find out the producing agencies. Let me give you a theory of causation, which will show you that your notion of a moral purpose is altogether out of place. The only true causes are phenomenal ones, or what is certified by experience. There are uniform and unconditional antecedents, and uniform and unconditional sequences. Something goes before, uniformly and invariably ; something uniformly and invariably follows. The first are causes ; the last are effects. We can not go farther back than the antecedent cause ; we can not go farther forward than the effect. We can not connect the effect with anything but the antecedent cause. When, therefore, you speak of a moral purpose, what do you mean ? Where do you get the evidence of the moral purpose ? What is the purpose, and what is the evidence of it ?

SOPHEREUS. I answer you as I have before—that the agencies which you call phenomenal causes could not have established themselves ; could not have originated their own uniformity ; could not have made the invariable connection between themselves and the effects. If we discard the idea of a moral and sentient being, a mind originating and ordaining the physical agencies, we have nothing left but those agencies ; and in this the human mind can not rest. It is not enough to say that it ought to rest there. It does not, will not, and can not. Science—what you call science—may rest there, but philosophy can not. It is unphilosophical to speak of the Unknown Cause, or the Unknown Power, underlying all manifestations, as something of which we can not conceive and must not personify. The ultimate power which underlies all phenomena necessarily implies a will, an intellectual origin, and a mental energy. That it is something whose mental operations we can not trace, is no argument against its personality, and no reason why we should not conceive of it as a mental energy.

KOSMICOS. You have more than once referred to the constitution of the human mind as if it had been constructed with an irresistible necessity to attribute everything to the action of a being, an intelligence, and a will. You should rather say that *some minds* have trained themselves to this mode of reasoning, because they have first received the idea of such a being as the final cause, as a matter of dogmatic teaching, and they have tried to reason it out so as to attain a conviction that what they have been taught is true. It is in this way that they have found what they consider as evidence of a moral purpose. But you have no warrant for the assumption that the human intellect has been put together in such a way that it can not avoid reaching the conclusion that all phenomena are to be imputed to the volition of a mind as their producing cause.

SOPHEREUS. In speaking of the human mind and its

incapacity to rest satisfied with what science can discover of immediate physical agencies in the production of phenomena, I have not overlooked the fact that the idea of a Creator has been dogmatically inculcated as a matter of belief. But I form my conception of the construction of the human mind from the operations of my own mind. I have not trained myself into any mode of reasoning. I have somehow been so placed in this world that, as I have frequently told you and as I am perfectly conscious, I am uninfluenced by any early teaching, and can judge for myself of the force of evidence. When I say, therefore, that the human intellect is so constituted that it is obliged to regard mind as the source of power, I exclude all teaching but the teaching of experience. There can not be two courses of reasoning that are alike correct. If you uncover a portion of the earth's surface, and find there structures, implements, and various objects which you are convinced that the forces of nature did not produce, you must conclude that they were the productions of mind availing itself of the capabilities of matter to be molded and arranged by the force of an intelligent will. You do not see that mind, you do not see the work in progress, but you are irresistibly led to the conclusion that there was a mind which produced what you have found. You can not reason on the phenomena at all, without having the conviction forced upon you that the ultimate cause was an intelligent being. You can not explain the phenomena without this conclusion. How, then, can you explain the more various and extraordinary phenomena of nature without attributing their production to mind? You have no more direct evidence that the Pyramids of Egypt, or an obelisk which has lain buried in the earth for thousands of years, were made by human hands, than you have for believing that an animal organism, or the solar system, was planned and executed by an intelligent being. In both cases, you have only indirect evi-

dence ; but in both cases that evidence addresses itself to your intellect upon the same principles of belief. In the case of the pyramid or the obelisk, you refer the construction to mind, because you see that mind alone could have been the real cause of its existence. In the case of the animal organism, or the mechanism of the heavenly bodies, you are obliged to reason in the same way. Hence I say that our minds are so constituted that there is but one method of correct reasoning, whether the phenomena are those which can be attributed only to human intellect, or are those which must be attributed to superhuman power and intelligence. Hence, too, I speak of a moral purpose as indicated by the phenomena. The pyramid and the obelisk were built with a moral purpose. The animal organism and all that follows from it, the structure of the solar system and all that follows from it, were made to be what they are with a moral purpose. When you ask me for the evidence of this purpose, I point to the fact that the phenomenal causes, as you denominate the mere physical agencies employed in the production of certain objects, were incapable of any volitional action, and that without volition the connection between the physical agencies and their effects could not have been established. The stone and the chisel were the immediate physical agencies which produced the obelisk. But who selected the stone and wielded the chisel ? And who designed the moral uses of the obelisk ? Procreation, by the sexual union, is the immediate physical cause of the existence of an individual animal. But who designed its structure, appointed for it a law of its being, and established the physical agencies which brought the individual into existence and the moral consequences that those agencies produce ?

KOSMICOS. We are no nearer to an agreement than we have been in our former discussions. And the reason is that you do not perceive the mission and the method of

science. Science undertakes to discover those causes of phenomena which can be verified by experience ; so that we can truly say that our knowledge has been advanced, and that we really do know something of the things which we talk about. This is the domain of science. Its conclusions do not extend into the region of that which is unknown and unknowable. Inasmuch as its conclusions are strictly positive, because they are demonstrated by experience, they negative, as matter of knowledge, anything beyond. You may speculate about what lies beyond, but you have no reason for saying that you know anything about it ; whereas men who reason as you do, and yet who do not accept dogmas simply as matters of faith, are constantly trying to persuade themselves that they know something about that of which they have no means of knowledge. If you accept that something as a matter of faith, because you are satisfied with the evidence which establishes, or is supposed to establish, a divine revelation, you have a ground for belief with which science does not undertake to interfere. But you have no ground for maintaining that, from the phenomena of nature alone, you can derive any knowledge beyond that which you can demonstrate as a scientific fact.

SOPHEREUS. I accept your definition of the aims and methods of science. But what I find fault with is the assumption that we are not entitled to say that we know or believe a thing which can not be demonstrated as a scientific fact, when we are all the time grounding such knowledge or belief upon reasoning that convinces us of the truth and reality of other things which in like manner are not demonstrable as scientific facts. You may say that this is not the knowledge which we derive from scientific facts, and therefore it is not to be dignified by the name of knowledge. But we are always acting and must act upon proofs which are not scientific demonstrations ; and whether we call this knowledge, or call it belief, we govern our lives according

to it. We accept the proof that a buried city was the habitation and work of intelligent human beings, because we know that the forces of nature, not guided and applied by intelligent wills, never constructed a city. We accept the proof that men are just, merciful, courageous, truthful, or the reverse of all this, because their actions prove it, although we can not look into their hearts. What does all the estimate of the characters of men rest upon, but upon their actions? And is not this entitled to be ranked as knowledge of the characters of individual men?

KOSMICOS. We must each retain his conclusions. Let our next discussion relate to the origin of the human mind, and then we shall see whether you will be able to resist the origin which evolution assigns to it.

SOPHEREUS. I shall be glad to meet you again.

CHAPTER XI.

Origin of the human mind—Mr. Spencer's theory of the composition of mind—His system of morality.

ACCORDING to their appointment, our two disputants have met to discuss the origin of mind.

SOPHEREUS. Will you begin this conference by stating the evolution theory of the origin of the human mind ?

KOSMICOS. Most willingly. I have thus far spoken of the hypothesis of evolution as affording an explanation of the origin of distinct animals, regarded simply as living organisms, differentiated from each other by the slow process of development from a common stock, by the operation of certain physical causes. I am now to account to you for the origin of the human mind, upon the same hypothesis, namely, that man is a development from some previous and lower organism. I acknowledge that what we call mind, or intellect, has to be accounted for ; and that we who hold the evolution theory of the origin of man as an animal must be able to suggest how his intellect became developed by the operation of the same natural causes which produced his physical organization. It is not material, in this inquiry, whether we agree with Darwin in assuming some one distinct living organism of a very low type, as the original stock from which all the other animal organisms have been derived, or whether we go with Spencer back to the primal molecules of organizable matter, and suppose that from a single cell have been developed all the organisms

possessing life, in a regular order of succession. Upon either supposition, the doctrine of evolution explains the origin of the human mind. For, upon either supposition, there was a point in the long series of new forms, each descending from a pre-existing form, at which the manifestations of what we call mind may be said to have begun. This link in the connected chain of organisms occurred where nervous organization began to act with some spontaneous movement, with some power of voluntary exertion, as distinguished from the involuntary exertions of a substance that acted only in a certain and fixed way, although that substance was endowed with life. The substance of nervous organization is alike in all animals. In some it acts in a limited manner, and without volitional control; in others, it acts in more varied modes, and it manifests some power of volitional control and volitional rest, as well as of involuntary movement. But in all animals the substance of which nervous organization is composed—the substance which acts in producing movement, whether voluntary or involuntary—is the same kind of physical structure. In the higher animals, the great nerve-center is the organ called the brain. To this organ proceed the impressions produced upon one set of nerves by external objects, or by light or heat. From the same organ proceed, by another set of nerves, those movements which the animal is endowed with the power of making from within. Contemplating, then, the whole animal kingdom as one great connected family, but divided into different species, all of which have a nervous organization, we find that each species is endowed with the power of generating other individuals of the same species and of the same nervous organization. In the long course of development of the several species, or forms of animal life, there comes about a nervous organization which acts freely within certain limits, but in a fixed and invariable mode, so that the movements are

uniformly the same, and not in any proper sense volitional. To such an animal we should not attribute any mind, for mind implies some power of comparison and variation, some ability to act in more than a prescribed way. This animal, which I have just supposed to possess a very limited power of nervous action, transmits that power to its descendants; and in some of the successive generations the power remains always at the same fixed point. But the laws of natural and sexual selection are perpetually operating among those descendants. In progress of time there comes to be developed another organism, which has a wider range of nervous action; and, as this ceaseless process of modification and improvement goes on, there is developed still another nervous organization which acts with still more varied movements. As the different species of animals become evolved out of those that have gone before, the expansion of nervous organization goes on; and as each new and higher and more complex stage is gained, individuals of the species have the power to transmit it to their descendants by ordinary generation. At length, as in some of the mammalia, a nervous organization is attained, whose action exhibits manifestations of what we call mind. There appears to be a power of something like reasoning and volition, because the nervous actions are so various and so much adapted to outward circumstances. Thus, before we reach the human animal, we find nervous organizations widely separated from those of the remote progenitor species, because they can do so much more, and can do it with an apparent power of voluntary variation. At last, this process of modifications accumulating upon modifications culminates in an animal in whose nervous organization we find the freest, the most complex, and the most various power of receiving into his brain the impressions derived from the external world, and of transmitting from his brain to the different organs of his body those movements which the ex-

ternal circumstances of his life, or his internal efforts, cause him to strive for and to effect. This animal was the primeval man.*

Looking back, then, to the primal source of all nervous organization, in the remote animal in which the nervous structure and action were at the crudest state of development, and remembering that there was a power of transmitting it to offspring, and that natural and sexual selection were unceasingly operating to expand and perfect it, we may trace the successive stages of its modification and growth, from the lowest to the highest, until we reach in the primeval man the highest development that it had yet attained. But throughout all its stages, from the lowest to the highest, the system of nervous organization and action is the same in kind. We do not call its manifestations or action mind, or speak of them as indicating mind, until we find it developed into a condition of some voluntary activity and power of variation, as it is in many of the animals inferior to man. But in all the animals, man included, mind is the action of the nervous organization when it evinces a superior power of variation ; and we speak of the brain of such animals as the seat of mind because that organ is the source to and from which nervous action proceeds.

Let me now illustrate this view by the acquisition of articulate speech and the formation of language. In many of the lower animals with which we are acquainted there is a power of uttering vocal sounds, and of understanding them when uttered by their fellows. It must have been a power possessed by those animals which were the progeni-

* Probably Kosmicos did not mean that man excels all other animals in the delicacy and perfection of his nervous organization, for some of his senses are inferior to those of some of the other animals, as his movements are less swift. Apparently his meaning is that, taken as a whole, the nervous organization of man evinces the greatest power of variation and the widest range of action.

tors of man in the long line of descent of one species from another. But in them it was a very limited power. It increased as the nervous organization and the vocal organs became in the successive species capable of a more varied action. The sounds of the external world impressed themselves upon the brains of the primeval men more forcibly than they did upon the brains of the other animals, and excited the nervous organization to reproduce or imitate them. Those emotions and desires which originated in the brain itself—the impressions of pain or the sensations of pleasure experienced in the nervous system—sought expression through the vocal organs. Certain sounds repeated alike by the same individual, or by numerous individuals, for a long time, became associated in their brains with certain feelings or sensations. What are called words were thus formed; which, at first, could have been nothing but the utterance of certain sounds by the vocal organs, expressing the sensations felt by the nervous organization, or the imitations of external noises. At length these vocal sounds are gathered in the memory, multiplied and systematized, and a rude language is formed. But, all the while, the first crude human language was nothing but the result of nervous action excited to greater activity than in the other animals, accompanied by nicer and more capable vocal organs and a greater power of using them. This acquisition, obtained by the primeval men, was transmitted to their descendants as an improved physical organization, and in those descendants it finally reached the marvelous development of the most perfect languages of antiquity.

Let us now retrace our steps back to the time when nervous organization, in the successive generations of the whole animal series regarded as one great family of kindred animals successively developed out of a common stock, began to act in such a way as to evince the presence of what we call mind. Once attained, this improved nervous or-

ganization would be transmitted by the parents to new individuals ; and so on through countless generations, just as the offspring would inherit the same physical structure as the parents in other respects.

Mental phenomena are the products of nervous organization. We have no means of knowing that mind is an organism or an entity. If it is an existence capable of surviving the death of the body, which evolution neither affirms nor denies, you must go to revelation for the grounds of belief in its immortality. There is no conflict between the evolution theory of the nature of mind and the doctrine of immortality as taught by revealed religion.

SOPHEREUS. I am not disposed to constitute myself a champion of revealed religion. I have lately read in the writings of some well-meaning persons, whose positions and convictions made them anxious about the truths of revelation, expressions of the opinion that there is no necessary conflict between the hypothesis of a revelation and the teachings of evolution. I have been rather surprised by such concessions. But through all our discussions, and throughout all my reflections and inquiries, I have excluded revealed religion from the number of proofs of our immortality. But it seems to me that, as to the possibility of a survival of the mind after the death of the body, you have stated yourself out of court, not because you have propounded something that is inconsistent with revelation, although it certainly is, but because you have made mind to consist in nothing but the action of nervous organization, and when that has perished what can remain ? You may say that science does not undertake to determine that mind is or is not a special existence capable of surviving the body. But, observe that you attribute to nervous action the production of phenomena to which you give the name of mind, when the nervous action evinces some power of volitional variation and control. Now, when and where

did this begin, in the long series of animal organisms which you assume have been successively evolved out of one another? Remember that, according to the system of evolution, there are supposed to have been countless forms of animal organisms, graduating by slow improvements into higher and higher organisms. Where and when and what was the first animal that possessed a nervous organization which would manifest the power of variation in so marked a degree as to render it proper to speak of the animal as possessing or evincing mind? Are not the works of naturalists of the evolution school filled with comparisons of the minds of different animals, and do they not contend that in many of them there are manifestations of mental power, of the exercise of reason and comparison, and a volitional action according to varying circumstances? Did, then, these manifestations of something like mental power begin in the anthropomorphous ape from whom we are supposed to be descended, or who is supposed to be of kin to us? Or did it begin in any one and which of the innumerable intermediate forms between that ape-like creature and the primeval man? And when once this improved and improving nervous organization had been developed and put into a condition to be transmitted to descendants, until in the primeval man it had attained its highest development, what was it but a more sensitive, more various, and complex condition of the substance of which all nervous tissues are composed? And when these tissues are decomposed and resolved into their original material elements, where and what is the mind, whether of man or beast? It is nowhere and nothing, unless you suppose that the improved and improving action of the nervous organization at last developed an existence which is not in itself material or physical, and which may be imperishable and indestructible, while the material and physical organs by and through which it acts for a time perish daily in our sight. If this

is a possible, it is a very improbable hypothesis, because the nature of the human mind points to a very different origin.

I surely do not need to tell you that like produces like. If the mind of man is now a spiritual essence, it is a wild conjecture to suppose that it was generated out of the action of a material substance, in whatever animal, or supposed species of animal, its genesis is imagined to have begun. We must therefore determine, from all the evidence within our reach, whether the mind is a spiritual existence. If it is, it is not difficult to reach a rational conclusion that its Creator contrived a means of connecting it for a season with the bodily organs, and made the generative production of each new individual body at the same time give birth to a new individual mind, whenever a new child is born into the world. We can not discover the nature of the connection, or the process by which generative production of a new body becomes also generative production of a new mind. These are mysteries that are hidden from us. But the fact of the connection—the simultaneous production of the new body and the new mind—is a fact that the birth of every child demonstrates. Whether the union takes place at any time before birth, or whether it is only at birth that the mind, the spiritual essence, comes into existence, and so may become capable of an endless life, we can not know. But that this occurs at some time in the history of every human being, we are justified in saying that we know.

I shall now contrast your hypothesis of the origin of the human mind with another and a very different one; and, in stating it, I shall borrow nothing from the Mosaic account of the creation of Adam and Eve. I shall not assert, on the authority of Moses, that God breathed into Adam a living soul, for that would be to resort to a kind of evidence which, for the present, I mean to avoid, and which would bring into consideration the nature of the means by which

the Hebrew historian was informed of the fact which he relates, and which he could have known in no other way. It would also give rise to a question of what was meant by "a living soul." But I shall assume that there is a spiritual and a material world ; that a spiritual existence is one thing and a material existence is another. I shall assume that there is a spiritual world, because all our commonest experience, our introspection and consciousness, our observation of what the human mind can do, its operations and its productions, its capacity to originate thought and to send it down the course of ages, its power to recognize and obey a moral law as a divine command, the monuments of every kind which attest that it is something which is not matter or material substance, prove to us that the human mind is essentially a spiritual existence ; and that while it acts and must act by and through bodily organs, so long as it acts in this world, it is a being quite distinct from all the physical substance and physical organism with which it is connected for a time. Physiology alone can teach us this much at least, that mind is not matter ; and experience, consciousness, and observation teach us that while the action of the mind may be suspended for a time when the nervous organization can not normally act, from disease or injury, the mind itself is not destroyed, but its action may be restored with the restoration of the brain to its normal condition.

I am going to assume another thing—the existence of the Creator, the Supreme Governor of the universe, having under his control the whole realms of the spiritual and the material world ; alike capable of giving existence to spiritual entities and to material organisms, and capable of uniting them by any connection and for any purpose that might seem to him good. I shall assume this, because some of you evolutionists concede, if I understand rightly, the existence and capacities of the Supreme Being, since

you assume, and rightly, that the whole question relates to his methods ; and you believe that he chose the method of evolution instead of the method of special creation for all the types of animal life excepting the aboriginal and created lowest form, out of which all the others have been evolved. With these two assumptions, then, the nature of a spiritual existence, and the existence and capacities of the Creator, I now state to you the opposite hypothesis of the origin and nature of the human mind.

A pair of human beings, male and female, is created by the hand and will of the Almighty ; and to each is given a physical organism, and a spiritual, intellectual self, or mind, which is endowed with consciousness and capable of thought. Why is this a rational supposition, aside from any evidence of the fact derived from its assertion by an inspired or a divinely instructed witness ? It is so, because, when this aboriginal pair of human creatures fulfill the law of their being, by the procreation of other creatures of the same kind, the offspring must be supposed to possess whatever the parents possessed of peculiar and characteristic organization. This law of transmission is stamped upon all the forms of organic life ; and we may well apply it to the first pair of human beings. Its operation must have begun in them and their offspring. Every law that proceeded from the will of the Supreme Being began to operate at some time ; and this law, like all others, must have been put in operation by the Creator at some definite period. He created in the first pair a bodily organization, and he created in each of them the spiritual entity that we now call mind, and established its connection with their bodily organs. He established in them also the power of procreating offspring ; and this included the production of a new individual of the same species, in whom would be united, by the same mysterious bond, the same kind of physical organization and the same kind of spiritual or intellectual

existence, which is not matter, and could not have been generated out of matter alone. The beginning of this connection of body and mind in the first parents was an occasional and special exercise of the divine power. It was not a miraculous exercise of power, because a miracle, in the proper sense, implies some action aside from a previously established course of things. It was simply a first exercise of the power in the case of the creation of the first human pair; that is, it was the establishment in them, specially, of the union of the body and soul. Its repetition in the offspring, for all time, and through successive generations, was left to the operation of the laws of procreation and heredity. The nature and operation of those laws are wrapped in mystery; but about the fact of their existence, and of the compound procreation of a new body and a new mind at every new birth, there can be no doubt whatever.

It seems to me that this hypothesis has in its favor a vast preponderance of probability, because—

1. The generation of mind or spirit out of matter is inconceivable.

2. The creation of mind by the Almighty is just as conceivable as his creation of a material organism; and the latter is conceded by all naturalists who admit that there was a first animal organism; and even some of the evolutionists hold that the first animal organism was directly fashioned by the Creator, although all the succeeding organisms were formed, as they contend, by natural and sexual selection.

3. The nature of mind—of the human mind—is the same in all individuals of the race. They may differ in mental power, but they all possess an intellectual principle that is the same in kind. To the production of mind, or its formation, the process of evolution was not necessary. Not only was it unnecessary, but in the nature of things it was not adapted to do what it is supposed to have done in

the production of physical organisms. To suppose that the Creator, instead of the direct exercise of his power of creation, left it to the material laws of natural and sexual selection to produce a mind, is to suppose him to have resorted to a method that was both unnecessary and indirect, and was furthermore incapable of effecting that kind of product. In reasoning about the methods of the Creator, it is certainly irrational to suppose him to have resorted to one that was so ill adapted to the accomplishment of his object. In the accomplishment of some physical objects, we may well suppose that they have been brought about by physical agencies that have operated very slowly and indirectly; and we can see that this has often been the case in regard to many material products. But for the production of mind, for the accomplishment of a spiritual existence, there can be imagined no secondary agencies, no gradual growth out of antecedent existences or substances, no evolution out of some other and that other a material organism. The first mind, the first human soul, must have come direct from the hand and will of God. The succeeding minds may well have been left to owe their existence to the laws of procreation, by a process which we can not understand, but of which we have proof in the birth of every child that has been born of woman.

KOSMICOS. We now have the two hypotheses of the origin and nature of the human mind fairly before us; and here I must point out to you wherein you do injustice to my side of the question. In the first place, your assumption of one pair of progenitors of the human race from whom have diverged all the varieties of the race, does not encounter the evolution process of man's descent as an animal. It is either an arbitrary assumption, or it is derived from the Mosaic account of the creation, which, in a scientific point of view, and aside from the supposed authority of that story, is just as arbitrary an assumption as if the

book of Genesis had never existed. Take, therefore, Darwin's hypothesis of the zoölogical series : First, a fish-like animal, of course inhabiting the water ; next, the amphibians, capable of living in the water and on the land ; next, the ancient marsupials ; next, the quadrumana and all the higher mammals, among whom are to be classed the *Simiadae* or monkeys ; and out of these came the hairy, tailed quadruped, arboreal in its habits, from which man is descended. This long line of descent is filled with diversified forms, intermediate between the several principal forms which are known to us, and which were successively the progenitors of man. Now, hear Darwin on the subject of one pair of progenitors :

“ But since he [man] attained to the rank of manhood he has diverged into distinct races, or, as they may be more fitly called, sub-species. Some of these, such as the negro and European, are so distinct that, if specimens had been brought to a naturalist without any further information, they would undoubtedly have been considered by him as good and true species. Nevertheless, all the races agree in so many unimportant details of structure and in so many mental peculiarities, that these can be accounted for only by inheritance from a common progenitor ; and a progenitor thus characterized would probably deserve to rank as man. It must not be supposed that the divergence of each race from the other races, and of all from a common stock, can be traced back to any one pair of progenitors. On the contrary, at every stage in the process of modification all the individuals which were in any way better fitted for their conditions of life, though in different degrees, would have survived in greater numbers than the less well fitted. The process would have been like that followed by man, when he does not intentionally select particular individuals, but breeds from all the superior individuals and neglects the inferior. He thus slowly but surely modifies his stock,

and unconsciously forms a new strain. So with respect to modifications acquired independently of selection, and due to variations arising from the nature of the organism and the action of the surrounding conditions, or from changed habits of life, no single pair will have been modified much more than the other pairs inhabiting the same country, for all will have been continually blended through free intercrossing." *

The meaning of this is that if you go back to the period when an animal, by the slow process of modification which was continually operating among the preceding organisms, had been raised to the present state of man, and then follow out the divergencies into the distinct races of men, those divergencies would not have occurred in consequence of any one pair having been modified much more than the other pairs inhabiting the same country, but all the individuals would have undergone a continually blending process through unrestrained intercrossing; and those individuals of both sexes, who became in a superior degree fitted for their conditions of life, would have survived in greater numbers than the less well fitted, and would have transmitted to their posterity those peculiarities which tended at last to produce different races of the human family. So that the notion of a single pair of the negro variety, or of a single pair of the Caucasian variety, formed and completed as an independent stock, is not necessary to account for these varieties.

To apply this, now, to the slow production of man's intellectual faculties, we must, if we would do justice to Darwin's hypothesis of the method in which he was developed as an animal, bear in mind that his mental powers, like his animal structure, have been the necessary acquirement of new powers and capacities by gradation, through

* Darwin's "Descent of Man," pp. 608, 609.

the perpetual process of modification, and retention and transmission of the new acquisitions. Darwin, indeed, does not professedly undertake the genealogy of the human mind; but he appears to hold the opinion that in future psychology will be based on the gradual acquisition of each mental power and capacity, as distinguished from their complete production in any one pair, or in any one being; and he refers to Herbert Spencer as having already securely laid the foundation for this new psychology.*

I take, therefore, the great English naturalist as the person who has most satisfactorily explained the origin of man as an animal, and the great English philosopher as the person who has propounded the most satisfactory theory of the origin of the human mind. The two hypotheses run parallel to and support each other. Man, as respects his mere animal structure, is an organism developed by a slow process of modification out of preceding organisms. His mental faculties have one by one grown out of the operation of the same physical agencies that have formed his animal structure, and they have not been bestowed at once upon any one pair, or upon any one individual of the race. After they have all been acquired, as we now know and recognize them, they have descended to the successive generations of the race.

SOPHEREUS. I have studied Mr. Spencer's "System of Psychology," but I do not know whether we understand it alike. You say that he has propounded the most satisfactory theory of the origin of mind. Assuming that mind was evolved as an aggregate of powers and capacities, slowly acquired, *pari passu* with the evolution of the animal organism, be good enough to tell me whether Mr. Spencer does or does not conclude that mind is anything more than an aggregate of powers and capacities of the nervous organi-

* Darwin's "Origin of Species," p. 428.

zation. I am quite aware of the mode in which he meets the charge of materialism ; but waiving for the present the question of materialism, I should be glad to know, according to your understanding of his philosophy, what he considers mind to be.

KOSMICOS. To answer your question requires an analysis of Spencer's "Principles of Psychology." You have here on your table the third edition of that work, which received his latest corrections and additions.* If you look at the preface of this edition, you will see that, as between Realism and Idealism, he enunciates a view which recognizes an element of truth in each, but rejects the rest. By this "Transfigured Realism" he aims to conciliate what is true in Realism with what is true in Idealism ; and it is by this conciliation that he answers the partisans of both systems, who will not sacrifice any part of their respective doctrines. It is important for you to remember this in judging of his psychological system. He begins by a description of the structure and functions of the nervous system, and the nature of nervous actions. Without repeating in all its minute details the structure which he describes, it is enough to say that in all animals, from the lowest to the highest, this peculiar part of the organism which we call the nervous system is composed of two tissues which differ considerably from those composing the rest of the organism. In color they are distinguished from one another as gray and white, and in their minute structures as vesicular and fibrous. In the gray tissue, the vesicles or corpuscles contain a soft protein substance, with granules imbedded in it, consisting of fatty matter. The more developed of these nerve-corpuscles give off branching processes, and the terminations of nerve-fibers are distributed among them.

* "The Principles of Psychology," by Herbert Spencer, third edition. New York: D. Appleton & Co., 1885.

The white tissue is composed of minute tubes containing a medullary substance or pulp, viscid like oil. Imbedded in this pulp, which fills the tubes, there lies a delicate fiber or axis-cylinder, which is uniform and continuous instead of having its continuity broken by fat-granules. This central thread is the essential nerve; and the sheath of medullary matter, and its surrounding membranous sheath, are only its accessories. While, therefore, the matter of nerve-fiber has much in common with the matter of nerve-vesicle, in the latter the protein substance contains more water, is mingled with fat-granules, and forms part of an unstable mass; whereas in the former, the nerve-tube, the protein substance, is denser, is distinct from the fatty compounds that surround it, and so presents an arrangement that is relatively stable.

Conceive, then, of this interlaced physical structure extending throughout the whole organism as a kind of circular mechanism, having its periphery at the surface of the body and limbs, ramifying among and into the internal organs, with various nerve-centers distributed through the interior mechanism, and the one great nerve-center in the brain. Conceive of this structure, further, as fed continually by the blood-vessels, which repair its waste of tissue and keep it in proper tone and activity. Then imagine it as first put in operation in some animal in whom it has become developed as we now know it in ourselves, and let that animal stand as the primeval man, who has become, by inherited transmission of gradual accumulations, possessed of this consummate development of nervous organization. You can then observe the method of its action, and can perceive how mind became developed, and what it is.

What I have now given you is only a general description of the structure of the nervous mechanism, and in order to understand its functions, we may take it up, in an individual, at a point of time when it had not experienced a single

movement or change from a state of rest, but when it was completely fitted to act. Observe, then, that its action will consist in the origination and accomplishment of motion ; or, in other words, in molecular change of the substance composing the nerves, which, for illustration only, may be likened to the conductor through which the molecular disturbance passes which is popularly, but not scientifically, called the electric fluid. At the surface of the body and limbs, the external termini of the nerves are exposed to disturbance by contact with an external object. Along the highly sensitive and minute conductor, the nerve which has by contact with an external object at its outer extremity received a slight shock, there passes through the fluid or semi-fluid substance of the nerve a wave of disturbance, or a succession of such waves. This disturbance reaches the brain, the great nerve-center, where it becomes a feeling. In this way is generated the feeling of contact with an external object, and this is what is commonly called the sense of touch, which is simply a feeling produced in the great nerve-center of the brain. Now, to reverse the process, let us suppose that this feeling, caused by touching an external object, provokes or excites a desire to remove that object, or to get rid of the continuance of the feeling, and to be without the irritation or pain which it is causing. From the central seat of nervous action, the brain, along another nerve, there proceeds a wave, or a series of waves, in the fluid or semi-fluid substance of which the conductor of that nerve is composed, and motion is communicated to some muscle or set of muscles, which need to be put in motion in order to break the contact with the external object. In like manner, all internal organs of the body, the viscera, are supplied with a system of nerves connected with the great nerve-center. If a disturbance arises in one of the viscera, some action that is abnormal, a sensation that is called pain is produced. So, too, in regard to the

normal action of the viscera, kept up by involuntary movements—those movements originate in and are transmitted from the nerve-center, by waves in the fluid or semi-fluid substance of which the special nerves are composed, whose office it is to cause the necessary movements in the muscular substance, or the tissue, of the particular organ.

In this way began, in the supposed individual, those simpler states of feeling which pain or irritation produced in the nervous system, and those other involuntary movements which were essential to the normal and unconscious action of the viscera. These varying conditions of the highly sensitive nervous system, which constitute and are rightly denominated feelings, were constantly repeated; and, so far as they are capable of becoming a part of consciousness, that consciousness is a repetition of the same nervous actions many times over. Pass, then, from the feelings called sensations to the feelings called emotions, and it will be found that while both are states of nervous action, the former are peripherally initiated and the latter are centrally initiated. The meaning of this is that a sensation is an effect produced at the nerve-center by the transmission, from the outer terminus of a particular nerve, of the waves in the fluid or semi-fluid substance of the nerve. The strong forms of feeling called sensations are peripherally initiated, and the feelings called emotions are centrally initiated. Now, any feeling of any kind is directly known by each person in no other place than his own consciousness; and the question is, Of what is consciousness composed? In order to afford an answer to this question, Mr. Spencer proceeds to examine the substance of mind, and then passes to a consideration of the composition of mind. These are not the same thing; for, if there be no such thing, properly speaking, as the substance of mind, its composition, or its nature, must be looked for in another way. The expression "substance of mind," if

used in any way but that in which we use the x of an algebraic equation, has no meaning. If we undertake to interpret mind in the terms of matter, as crude materialism does, we are at once brought to this result, that we know, and can know, nothing of the ultimate substance of either. We know matter only as forms of certain units; but the ultimate unit, of which the ultimate homogeneous units are probably composed, must remain absolutely unknown. In like manner, if mind consists of homogeneous units of feeling, the ultimate unit, as a substance, must remain unknown. When, therefore, we think of the substance of mind, the simplest form under which we can think of it is nothing but a symbol of something that can never be rendered into thought, just as the concept we form to ourselves of matter is but the symbol of some form of power absolutely and forever unknown to us, as the representation of all objective activities in terms of motion is only a symbolic representation, and not a knowledge of them. Symbols of unknown forms of existence, whether in the case of matter, motion, or mind, are mere representations which do not determine anything about the ultimate substance of either. "Our only course is constantly to recognize our symbols as symbols only, and to rest content with that duality of them which our constitution necessitates. The unknowable as manifested to us within the limits of consciousness in the shape of feeling, being no less inscrutable than the unknowable as manifested beyond the limits of consciousness in other shapes, we approach no nearer to understanding the last by rendering it into the first."*

Discarding, then, the expression "substance of mind," excepting as a mere symbol, Mr. Spencer passes to the "composition of mind"; and here we reach his explanation of mind as an evolution traceable through ascending

* "Principles of Psychology," i, p. 162.

stages of composition, conformably to the laws of evolution in general, so that the composition of mind, as something evolved out of simple elements, does not need or involve a symbolical representation in the terms of matter.

The method of composition, by which the whole fabric of mind is constituted, from the formation of its simplest feelings up to the formation of the complex aggregates of feelings which are its highest developments, can now be sketched. A sensation is formed by the consolidation of successive units of feeling ; but the feelings called sensations can not of themselves constitute mind, even when many of different kinds are present together. When, however, each sensation, as it occurs, is linked in association with the faint forms of previous sensations of the same kind, mind is constituted ; for, by the consolidation of successive sensations, there is formed a knowledge of the particular sensation as a distinct subject of what we call thought, or the smallest separable portion of thought as distinguished from mere confused sentiency. Thus, as the primitive units of feeling are compounded into sensations, by the same method simple sensations, and the relations among them, are compounded into states of definite consciousness. The next highest stage of mental composition is a repetition of the same process. Take a special object, which produces in us a vivid cluster of related sensations. When these are united with the faint forms of like clusters that have been before produced by such objects, we know the object. Knowledge of it is the assimilation of the combined group of real feelings which it excites, with one or more preceding ideal groups which were once excited by objects of the same kind ; and, when the series of ideal groups is large, the knowledge is clear. In the same way, by the connections between each special cluster of related sensations produced by one object, and the special clusters generated by other objects, a wider knowledge is obtained.

By assimilating the more or less complex relations exhibited in the actions of things in space and time, with other such complex relations, knowledge of the powers and habits of things is constituted. If we can not so assimilate them, or parts of them, we have no knowledge of their actions. So it is, without definite limit, through those tracts of higher consciousness which are formed of clusters of clusters of feelings held together by extremely involved relations. This law of the composition of mind is, therefore, the assimilation of real feelings and groups of real feelings with the ideal feelings or ideal groups of feelings which objects of the same kind once produced. You can follow out, without my assistance, the correspondence which Mr. Spencer exhibits between the views of mental composition and the general truths respecting nervous structure and nervous functions with which he began the treatment of mind, which consists largely, and in one sense entirely, of feelings. The inferior tracts of consciousness are constituted by feelings; and the feelings are the materials out of which are constituted the superior tracts of consciousness, and thus intellect is evolved by structural combination. "Everywhere feeling is the substance of which, when it is present, intellect is the form. And where intellect is not present, or but little present, mind consists of feelings that are unformed or but little formed."* Does not this statement, which in substance is Mr. Spencer's explanation of the formation of mind, explain to you why he denominates it "transfigured realism"?

SOPHEREUS. I have attentively and carefully read Mr. Spencer's book from which you have made this partial analysis of his view of the nature of mind, but whether it is realism "transfigured," or whatever is, I think it must

* "Principles of Psychology," ii, p. 503.

be admitted that its basis is a truly realistic one; for it comes back at last to just what I suggested to you at the beginning of this discussion, that mind, according to his view, is constituted by the action of the nervous system, or, in other words, that mind consists of the phenomena of movements which take place in a physical structure. If this is all that can be predicated of mind, it is not something that can have an independent and continuous existence after the dissolution of the physical structure called the nervous system. That structure is one that is analogous in its action to the other part of the organism by which digestion, or the assimilation of food, is carried on. We might as well suppose that by the action of the digestive system there has been constituted a something which will remain as a digestive function after the organs of digestion have perished, as to suppose that the action of the nervous system has constituted a something which will remain mind, a conscious and independent existence, after the nervous system has been resolved into its original material elements. Indeed, I do not understand Mr. Spencer's philosophy as including, providing for, or leading to, any possible continued existence of the mind after the death of the body. He seems to exclude it altogether. There is a passage at the end of one of his chapters which appears to be a summary of his whole philosophic scheme, and which is one of the dreariest conclusions I have ever met with. "Once more," he says, "we are brought round to the conclusion repeatedly reached by other routes, that behind all manifestations, inner and outer, there is a Power manifested. Here, as before, it has become clear that while the nature of this Power can not be known, while we lack the faculty of forming even the dimmest conception of it, yet its universal presence is the absolute fact without which there can be no relative facts. Every feeling and thought being but transitory, an entire life made up of such feelings

and thoughts being also but transitory, nay, the objects amid which life is passed, though less transitory, being severally in course of losing their individualities quickly or slowly ; we learn that the one thing permanent is the Unknowable Reality hidden under all these changing shapes." *

I will not say that the mournful character of this hopelessness of human destiny is proof of its unsoundness. I have accustomed myself to accept results, whatever may be the gloom in which they involve us, provided they are deductions of sound reasoning ; and our wishes or hopes can not change the constitution of the universe or become important evidence for or against any view of what that constitution is. But let me ask, what does this philosopher mean by the transitory character of an entire life made up of transitory feelings and thoughts, occupied throughout their continuance with transitory objects, or objects which are quickly or slowly losing their individualities ? What possible room does he leave for the development and discipline of an immortal being, supposing that man is an immortal being, by an entire life passed in feelings, thoughts, and action about objects which, relatively to the individual, may, quickly or slowly, pass away from him ? Or, what room does he allow for the effect on such a being of an entire life spent in the pursuit of objects or the enjoyment of pleasures which develop only his baser nature and unfit him for anything else ? In any scheme of philosophy which omits to regard this life as a preparatory school for some other life, it seems to me that something is left out which ought to be included, and which ought to be included for the very reason that the evidence which tends to show that mind is not constituted as Mr. Spencer supposes, but that it is an existence of a special character, not generated by the action of a physical structure, but deriving its

* "Principles of Psychology," ii, p. 503.

existence from the direct action of the creating Power, is so strong that, if we leave this conclusion out of the hypothesis, we shall have left out the strongest probabilities of the case. It is no answer to the necessity for including this conclusion to say that there is a power which we can not know, or an Unknowable Reality hidden under all changing manifestations, among which are those of mind. A study of those manifestations leads rightly to some conclusions respecting the Power which underlies all manifestations. It is necessary, therefore, to subject Mr. Spencer's philosophy of mind to the further inquiry, How does he account for the moral sense? How does he explain that part of consciousness which recognizes moral obligations—the recognition of moral law and duty? We may easily dispense with the phrase "substance of the mind," if we wish to avoid a term of matter; but if mind is constituted by the perception of feelings excited in the nervous system, what is it that perceives? Is there a something that is reached by the feelings which constitute sensations in the great nerve-center, which takes cognizance of them, which combines them into portions of consciousness, or is consciousness nothing but a succession of sensations, and if so, what is "thought"? And what is that portion of thought which takes cognizance of moral duty, and which shows man to be capable of recognizing and obeying or breaking a moral law? I have somewhere read a suggestion that the polity which is said to have been given to the Hebrew people on the Mount of Sinai, and which is described as ten statutes written on two tablets of stone, consisted of five laws on one tablet and five on the other; one set of them expressing the relations of the Hebrews to the Deity, and the other being the fundamental laws of the social life which the Hebrews were commanded to lead. This division is not accurate, because the commandments which express the relations of the Hebrews to the Deity are four in num-

ber, and the commandments which were to constitute their social law are six. But that there is a line of demarkation between the two kinds of laws is obvious, and how they were written on the tablets, or whether they were written at all, is immaterial. Looking, then, first at the social law, whether there was more or less of the same ethical character in the codes of other ancient peoples, or whether the social law which is said to have been delivered to Moses and by him communicated to his nation stands as an embodiment of morality unequaled by anything that had preceded it, it is certain that it found the Hebrew people capable of the idea of law as a divine command. It is true that the corner-stone of the whole superstructure is to be found in the fact that the several commands which constituted this social code—"Honor thy father and thy mother," "Thou shalt do no murder," "Thou shalt not commit adultery," "Thou shalt not steal," "Thou shalt not bear false witness against thy neighbor," "Thou shalt not covet thy neighbor's house," etc.—were addressed to a people to whose representatives the Almighty is supposed to have revealed himself amid "thunders and lightnings, and a thick cloud upon the mount, and the voice of a trumpet exceeding loud, and all the people that were in the camp [below] trembled." It is also true that the first of these awful annunciations was said to have been, "I am the Lord thy God, which brought thee out of the land of Egypt, out of the house of bondage. Thou shalt have no other gods before [or beside] me."* So that the source whence all the following commands proceeded was the one and only God, who is described as having thus revealed himself in fire and cloud and earthquake, and thus to have secured instant and implicit faith in what he spoke. But what he is asserted to have said was addressed to human minds. This is in one

* Revised version.

aspect the most important fact in the whole Hebrew history. It makes no difference whether Moses performed a piece of jugglery, or whether he actually went within the fire and the cloud, and actually spoke with God and received his commands. The indisputable truth remains that the individual minds of the Hebrew people, whom Moses had led out of Egypt, received and obeyed, as divine commands, an original and unique moral code, because they were so constituted that they could embrace and act upon the idea of law emanating from another than an earthly or a human source. What, then, was this constitution of the human mind, that could thus receive and act upon a divine command ; and what is it now ? It matters not, in the view in which I ask this question, whether there was any deceit practiced or not, or whether there is any practiced now in respect to the authority giving the command. What is to be accounted for is the capacity of the human mind to embrace and accept the idea of a moral law, be it that of Moses, or of Christ, or of Mohammed.

KOSMICOS. I am glad that you put this matter of the ten commandments hypothetically, because otherwise we might have been led aside into an argument about the authenticity of the narrative. I recognize, however, the bearing of the question which you have put, and shall endeavor to answer it. Your question implies that the essential constitution of the human mind has been the same in all ages ; that it was the same in this race of nomads, who had been, they and their fathers for ages, serfs of the Egyptian kings, that it is in us. Perhaps this assumption may be allowed ; and, at all events, the real question is, How did the idea of a moral law originate, and what is the sense of moral obligation ? Like all things else, it is a product of the process of evolution. I shall not argue this by any elaborate reasoning, but will proceed to state the grounds on which it rests. I will first give you what I understand to be Dar-

win's view of the origin of the habit of thinking and feeling, which we call the moral sense. Primeval man must have existed in a state of barbarism. When he had become developed out of some pre-existing animal, he was a mere savage, distinguishable from his predecessors only by the possession of some superior degree of mental power. Savages, like some other animals, form themselves into tribes or bands. Certain social instincts arise, out of which spring what are regarded as virtues. Individuals of the tribe begin to desire the sympathy and approbation of their fellows. They perceive that certain actions, such as protection of other and weaker individuals against danger, gain for them the sympathy and approbation of the tribe. There are thus formed some ideas of the common advantage to the tribe of certain actions, and of the common disadvantage of the opposite actions. Man is eminently a social animal, and this desire for the sympathy and approbation of his tribe, and this fear of their disapprobation, is so strong that the individual savage is led to perceive that the common good of the tribe is the object at which he must aim to conform. The first social instincts, therefore, are those which perceive the relations between certain kinds of conduct and the common good of the tribe ; and out of these relations, with the aid of increasing intellectual powers, is developed the golden rule, "As ye would that men should do to you, do ye to them likewise," which lies at the foundation of morality. These social instincts, thus leading at last to the great rule of social morality, are developed very slowly. They are at first confined to the benefit of the same tribe, and they have no force in the relations of that tribe to the members of any other. To a savage it is a highly meritorious action to save the life of another member of his own tribe, and if he loses his own life in the effort it is so much the more meritorious. But he does not extend this idea of doing a good action to the members of a different

tribe, and, whether his own tribe is or is not at war with the other tribe, he and his own community will think it no harm if he murders a member of that other tribe. But as the approach to civilization goes on—as man advances in intellectual power, and can trace the more remote consequences of his actions, and as he rejects baneful customs and superstitions, he begins to regard more and more not only the welfare but the happiness of his fellow-men. Habit, resulting from beneficial experiences, instruction and example, renders his sympathies more tender and widely diffused, until at last he extends them to men of all races, to the imbecile, maimed, and other useless members of society, and to the inferior animals. Thus the standard of morality rises higher and higher; but its origin is in the social instincts, which spring out of the love of approbation and the fear of disapprobation.*

But morality comprehends also the self-regarding virtues, those which directly affect the individual, and which affect society but remotely and incidentally. How did the idea of these originate? There is a very wide difference between the morality of savages, in respect to the self-regarding virtues, and the morality of civilized nations. Among the former, the greatest intemperance, utter licentiousness, and unnatural crimes are very common. But as soon as marriage was introduced, whether monogamous or polygamous, jealousy led to the inculcation of female virtue; and this, being honored, spread to the unmarried females. Chastity, the hatred of indecency, temperance, and many other self-regarding virtues, originating first in the social instincts, have come to be highly prized by civilized nations as affecting, first, the welfare of the community, and, secondly, the welfare of the individual. This was the origin of the so-called "moral sense." It rejects the

* Darwin, "Descent of Man," Part I, chap. iv.

intuitive theory of morality, and bases its origin on the increasing perception of the advantage of certain conduct to the community and the individual.*

SOPHEREUS. And in this origin of the social and the self-regarding virtues, which I understand you to say is the theory of Darwin, is the idea of a divine command to practice certain things, and to avoid doing certain other things, left out?

KOSMICOS. The idea of a divine command, as the source of morality, is not necessary to the explanation of the mode in which the social or the self-regarding virtues were gradually developed. In the progress from barbarism to civilization, what is called the moral sense has been slowly developed as an increasing perception of what is beneficial, and this has become an inherited faculty. We thus have a sure scientific basis for the moral intuitions which we do not individually stay to analyze when we are called upon to determine the morality or the immorality of certain actions. The supposed divine command is something that is aside from the process by which the idea of morality or immorality became developed.

SOPHEREUS. And is this also Mr. Spencer's philosophy of the moral sense?

KOSMICOS. Let me read you what Spencer says: "I believe that the experience of utility, organized and consolidated through all past generations of the human race, has been producing corresponding modifications which, by continued transmission and accumulation, have become in us certain *faculties* of moral intuition—certain *emotions* responding to right and wrong conduct, which have no *apparent* basis in the *individual* experiences of utility." † I have emphasized certain words in this passage in order to

* "Descent of Man," Part I, chap. iv.

† Quoted in Darwin's "Descent of Man," p. 123.

make its meaning distinct. Mr. Spencer's theory is that we have certain *faculties* of moral intuition, which have become such by transmission and accumulation ; that the original ideas of right and wrong sprang from perceptions of utility ; and that when to the individual the question of a good or a bad action in others or himself is now presented, he feels an *emotion* which responds to right or wrong conduct, and feels it in the *faculty* which he has inherited from ancestors, without referring it to his *individual* experience of the utility or inutility of certain conduct.

Now, in regard to the divine command as the origin of our ideas of right and wrong, if you turn to Mr. Spencer's "Principles of Sociology," you will find an immense collection of evidence which shows the genesis of deities of all kinds. Beginning with the ideas formed by the primitive men of souls, ghosts, spirits, and demons, the ideas of another life and of another world, there came about the ideas of supernatural beings, aided in their development by ancestor-worship, idol-worship, fetich-worship, animal-worship, plant-worship, and nature-worship. Hence came the ideas of deities of various kinds, one class of which is that of the human personality greatly disguised, and the other is the class which has arisen by simple idealization and expansion of the human personality. The last class, although always coexisting with the other, at length becomes predominant, and finally there is developed the idea of one chief or supreme deity. Having traced the origin of this idea of a supreme deity, Mr. Spencer puts and answers this question : "While among all races and all regions, from the earliest times down to the most recent, the conceptions of deities have been naturally evolved in the way shown, must we conclude that a small clan of the Semitic race had given to it, supernaturally, a conception which, though superficially like the rest, was in substance abso-

lutely unlike them?"* He then proceeds to show that the Hebrew Jehovah, or God, was a conception that had a kindred genesis with all the other conceptions of a deity or deities. "Here," he says, "pursuing the methods of science, and disregarding foregone conclusions, we must deal with the Hebrew conception in the same manner as with all the others." Dealing with it by the scientific method, he shows that behind the supernatural being of the order of the Hebrew God, as behind the supernatural beings of all other orders, there has in every case been a human personality. Thus, taking the narrative as it has come down to us of God's dealing with Abraham, he shows that what Abraham thought, or is described as thinking by those who preserved the tradition, was of a terrestrial ruler who could, like any other earthly potentate, make a covenant with him about land or anything else, or that he was the maker of all things, and that Abraham believed the earth and the heavens were produced by one who eats and drinks, and feels weary after walking. Upon either idea, Abraham's conception of a Deity remains identical with that of his modern Semitic representative, and with that of the uncivilized in general. But the ideas of Deity entertained by cultivated people, instead of being innate, arise only at a comparatively advanced stage, as results of accumulated knowledge, greater intellectual grasp, and higher sentiment.†

To return now to the supposed divine command as the origin of morality, it is obvious that the conception of the being who has uttered the command makes the nature of the command partake of the attributes ascribed to that being. Accordingly, the grossest superstitions, the most revolting practices, the most immoral actions, have found

* "Principles of Sociology," i, p. 433, § 202.

† Ibid., chap. xxv, p. 414 *et seq.*

their sanction in what the particular deity who is believed in is supposed to have inculcated or required. I do not need to enumerate to you the proofs of this, or to tell you that the Hebrew God is no exception to it. One illustration of it, however, is worth repeating. Speaking of the ceremony by which the covenant between God and Abraham is said to have been established, Mr. Spencer says: "Abraham and each of his male descendants, and each of his slaves, is circumcised. The mark of the covenant, observe, is to be borne not only by Abraham and those of his blood, but also by those of other blood whom he has bought. The mark is a strange one, and the extension of it is a strange one, if we assume it to be imposed by the Creator of the universe, as a mark on a favored man and his descendants; and on this assumption it is no less strange that the one transgression for which every 'soul shall be cut off' is, not any crime, but the neglect of this rite. But such a ceremony insisted on by a living potentate, under penalty of death, is not strange, for, as we shall hereafter see, circumcision is one of various mutilations imposed as marks on subject persons by terrestrial superiors." *

So that the Hebrew God who made the covenant with Abraham was not, in Abraham's own conception, the First Cause of all things, or a supernatural being, but he was a powerful human ruler, making an agreement with a shepherd chief. In all religions, the things required or commanded by the supposed deified person have been marked by the characteristics of human rulers; and as a source of morality, or as a standard of morality, the requirements or commands of the deified person, however they are supposed to have been communicated, fail to answer the indispensable condition of a fixed and innate system of morality, which is that it must have proceeded from the Creator of the

* "Principles of Sociology," i, p. 135.

universe, and not from a being who partakes of human passions, infirmities, and desires, and is merely a deified human potentate.

Pass, now, to Mr. Spencer's "Principles of Morality"; and although but one volume of this work has been as yet published, we may see that he is entirely consistent with what he has said in his "Sociology" and his other writings.* He does not leave us in any doubt as to his theory of morals. It appears, from the preface to his "Data of Ethics," that he has been compelled by ill-health to deviate from the plan which he had mapped out for himself, and to publish one volume of his "Principles of Morality" before completing his "Principles of Sociology." But while we have reason for his sake and for the sake of the world to regret this, we can easily understand his system of morality. He means to rest the rules of right conduct on a scientific basis, and he shows that this is a pressing need. In his preface, he says :

I am the more anxious to indicate in outline, if I can not complete, this final proof, because the establishment of rules of right conduct on a scientific basis is a pressing need. Now that moral injunctions are losing the authority given by their supposed sacred origin, the secularization of morals is becoming imperative. Few things can happen more disastrous than the decay and death of a regulative system no longer fit, before another and fitter regulative system has grown up to replace it. Most of those who reject the current creed appear to assume that the controlling agency furnished by it may be safely thrown aside, and the vacancy left unfilled by any other controlling agency. Meanwhile, those who defend the current creed allege that, in the absence of the guidance it yields, no guidance can exist; divine commandments they think the only possible guides. Thus, between these extreme opponents there is a cer-

* "Principles of Morality," vol. i. I. "The Data of Ethics." By Herbert Spencer. New York : D. Appleton & Co., 1884.

tain community. The one holds that the gap left by disappearance of the code of supernatural ethics need not be filled by a code of natural ethics; and the other holds that it can not be so filled. Both contemplate a vacuum, which the one wishes and the other fears. As the change which promises or threatens to bring about this state, desired or dreaded, is rapidly progressing, those who believe that the vacuum can be filled are called upon to do something in pursuance of their belief.

The code of natural ethics which Mr. Spencer propounds, and which is a product of the process of evolution, may be summarized as follows: Conduct is an aggregate of actions which are not purposeless, but which include all acts that are adjusted to ends, from the simplest to the most complex. The division or aspect of conduct with which ethics deals, the behavior we call good or bad, is a part of an organic whole; but, although inextricably bound up with acts which are neither good nor bad, it is distinguishable as comprehending those acts with which morality is concerned. The evolution of conduct, from the simplest and most indifferent actions up to those on which ethical judgments are passed, is what Mr. Spencer means by the scientific method of investigating the origin of morality. We must begin with the conduct of all living creatures, because the complete comprehension of conduct is not to be obtained by contemplating the conduct of human beings only. "The conduct of the higher animals as compared with that of man, and the conduct of the lower animals as compared with that of the higher, mainly differ in this, that the adjustments of acts to ends are relatively simple and relatively incomplete. And as in other cases, so in this case, we must interpret the more developed by the less developed. Just as, fully to understand the part of conduct which ethics deals with, we must study human conduct as a whole, so, fully to understand human conduct as a whole, we must study it as a part of that

larger whole constituted by the conduct of animate beings in general." *

Begin, for example, with an infusorium swimming about at random, determined in its course not by an object which it perceives and which is to be pursued or escaped, but apparently by varying stimuli in its medium, the water. Its acts, unadjusted in any appreciable way to ends, lead it now into contact with some nutritive substance which it absorbs, and now into the neighborhood of some creature by which it is swallowed and digested. Pass on to another aquatic creature, which, although of a low type, is much higher than the infusorium, such as a rotifer. With larger size, more developed structures, and greater power of combining functions, there comes an advance in conduct. It preserves itself for a longer period by better adjusting its own actions, so that it is less dependent on the actions going on around. Again, compare a low mollusk, such as a floating ascidian, with a high mollusk, such as a cephalopod, and it is apparent how greater organic evolution is accompanied by more evolved conduct. And if you pass then to the vertebrate animals, you see how, along with advance in structure and functions, there is evolved an advance in conduct, until at length, when you reach the doings of the highest of mammals, mankind, you not only find that the adjustments of acts to ends are both more numerous and better than among the lower mammals, but you find the same thing on comparing the doings of the higher races of men with those of the lower races. There is a greater completeness of achievement by civilized men than by savages, and there is also an achievement of relatively numerous minor ends subserving major ends.

Recollecting, then, what conduct is—namely, the ad-

* "The Data of Ethics," pp. 6, 7, by Herbert Spencer. New York: D. Appleton & Co., 1884.

justment of acts to ends—and observing how this adjustment becomes more and more complete as the organism becomes more developed, we have to note the order of the ends to which the acts are adjusted. The first end, the first stage of evolving conduct, is the further prolongation of life. The next is that adjustment of acts to ends which furthers an increased amount of life. Thus far the ends are complete individual life. Then come those adjustments which have for their final purpose the life of the species. Then there is a third kind of conduct, which results from the fact that the multitudinous creatures which fill the earth can not live wholly apart from one another, but are more or less in presence of one another, are interfered with by one another. No one species can so act as to secure the greatest amount of life to its individuals and the preservation of the species—can make a successful adjustment of its acts to these ends—without interfering with the corresponding adjustments by other creatures of their acts to their ends. That some may live, others must die. Finally, when we contemplate those adjustments of acts to ends which miss completeness, because they can not be made by one creature without other creatures being prevented from making them, we reach the thought of adjustments such that each creature may make them without preventing them from being made by other creatures. Let me now quote Mr. Spencer's concrete illustrations of these abstract statements :

“Recognizing men as the beings whose conduct is most evolved, let us ask under what conditions their conduct, in all three aspects of its evolution, reaches its limit. Clearly while the lives led are entirely predatory, as those of savages, the adjustments of acts to ends fall short of this highest form of conduct in every way. Individual life, ill carried on from hour to hour, is prematurely cut short ; the fostering of offspring often fails, and is incomplete when it

does not fail ; and in so far as the ends of self-maintenance and race-maintenance are met, they are met by destruction of other beings, of different kind, or of like kind. In social groups formed by compounding and recompounding primitive hordes, conduct remains imperfectly evolved in proportion as there continue antagonisms between the groups and antagonisms between members of the same group—two traits necessarily associated ; since the nature which prompts international aggression prompts aggression of individuals on one another. Hence, the limit of evolution can be reached by conduct only in permanently peaceful societies. That perfect adjustment of acts to ends in maintaining individual life and rearing new individuals, which is effected by each without hindering others from effecting like perfect adjustments, is, in its very definition, shown to constitute a kind of conduct that can be approached only as war decreases and dies out.

“A gap in this outline must now be filled up. There remains a further advance not yet even hinted. For beyond so behaving that each achieves his ends without preventing others from achieving their ends, the members of a society may give mutual help in the achievement of ends. And if, either indirectly by industrial co-operation, or directly by volunteered aid, fellow-citizens can make easier for one another the adjustments of acts to ends, then their conduct assumes a still higher phase of evolution ; since whatever facilitates the making of adjustments by each, increases the totality of the adjustments made, and serves to render the lives of all more complete.”

In the outline which I have now given you of the evolution of conduct, you will perceive the foundation of Spencer's system of ethics. Actions begin to assume an ethical character—conduct becomes good or bad—when the acts tend to promote or to prevent the general well-being of the community. But how is the perception or recognition of this qual-

ity in an action reached? What is the determining reason for considering an action good or bad? Obviously, conduct is considered by us as good or bad according as its aggregate results to self, or others, or both, are pleasurable or painful. Mr. Spencer shows that every other proposed standard of conduct derives its authority from this standard: "No school can avoid taking for the ultimate moral aim a desirable state of feeling called by whatever name—gratification, enjoyment, happiness. Pleasure somewhere, at some time, to some being or beings, is an inexpugnable element of the conception. It is as much a necessary form of moral intuition as space is a necessary form of intellectual intuition."*

On this fundamental basis, Mr. Spencer rests his system of absolute ethics and relative ethics. Relative ethics are those by which, allowing for the friction of an incomplete life and the imperfections of existing natures, we may ascertain with approximate correctness what is the relatively right. This is often exceedingly difficult, because two cases are rarely the same in all their circumstances. But absolute ethics are the ideal ethical truths, expressing the absolutely right. Such a system of ideal ethical truths, which must have precedence over relative ethics, is reached only when there has been, in conformity with the laws of evolution in general, and in conformity with the laws of organization in particular, an adaptation of humanity to the social state, changing it in the direction of an ideal congruity. But, as in relative ethics, the production of happiness or pleasure is the aim, however imperfectly accomplished, so in the ideal state the aim is the same, the difference being that in the latter the accomplishment of happiness or pleasure and the exclusion or prevention of pain are complete.

* "The Data of Ethics," pp. 45, 46, by Herbert Spencer. New York: D. Appleton & Co., 1884.

SOPHEREUS. And do I understand you that in this system of ethics the idea of a moral law proceeding from and consisting of the command of a Supreme Lawgiver is left out?

KOSMICOS. Certainly it is. Did I not just now read to you from Mr. Spencer's preface his complete rejection of the supposed sacred origin of moral injunctions, and what he says of the necessity for the secularization of morals to take the place of that system which is losing its authority?

SOPHEREUS. And this philosopher is the same writer who negatives the idea of any creation of organic life, and who also negatives the idea that the human mind is an existence of a spiritual nature, owing its existence to a Creator?

KOSMICOS. Undoubtedly; we have gone over all that ground.

SOPHEREUS. And he is the same philosopher who denies the existence of a Supreme Being, Creator, and Governor of the universe?

KOSMICOS. Perhaps you may call it denial, although what he maintains is that we know, and can know, nothing on the subject of a personal God.

SOPHEREUS. Very well. I will reflect upon all this until we meet again.

CHAPTER XII.

Mr. Spencer's philosophy as a whole—His psychology, and his system of ethics—The sacred origin of moral injunctions, and the secularization of morals.

A CERTAIN honesty and directness of mind prevent Sopherus from being bewildered by the Spencerian philosophy. Before his next meeting with the scientist, he has reviewed the main features of this philosophy as developed in Mr. Spencer's published works ; and he has taken notice of the warning which Mr. Spencer has given to his readers in the preface to his "Data of Ethics," that "there will probably be singled out for reprobation from this volume, doctrines which, taken by themselves, may readily be made to seem utterly wrong." There is not much likelihood that Sopherus will be able, if he is willing, to avail himself of this "opportunity for misrepresentation" in a discussion with such a champion of Mr. Spencer's philosophy as the scientist who explains and defends it, especially as they have the works before them to refer to. Being thus respectively equipped for the discussion, the conference between them proceeds :

SOPHEREUS. Before I give you my convictions respecting Mr. Spencer's philosophy as a whole, I wish to say something about the passage which you read from the preface to his "Data of Ethics," because it is the key to his ethical system. In the first place, to what does he refer when he speaks of "the current creed" ? When I undertake to investigate a system of morality, the only "creed" that I care

about—the only one that is of any importance—is that which accepts, as a matter of belief, the existence of the Creator and Supreme Governor of the universe, from whose infinite will and purposes have proceeded certain moral as well as physical laws. This, I take it, is the "creed" of which Mr. Spencer speaks; the one which assigns moral injunctions to the will of a Supreme Lawgiver as "their supposed sacred origin." It is to this creed that he opposes his "secularization of morals," which must take the place of their supposed sacred origin, because the authority of the latter is rapidly dying out of the world. It is this "creed" which is rejected by those who "assume that the controlling agency furnished by it may be safely thrown aside, and the vacancy left unfilled by any other agency."

Undoubtedly there are and always have been numerous persons who appear practically to think that the sacred origin of morality can be safely rejected, and that the vacancy may be left unfilled by any other restraining agency. The deliberate and willful murderer, the burglar, the adulterer, and many of the other criminal classes, not only appear to reject "the current creed," but they would be very glad to have it assumed that there is no other restraining agency to take its place. So, too, there are persons who break no moral law, whose lives are pure, but who, having theoretically persuaded themselves that there is no sacred origin of moral injunctions, omit to provide, for themselves or others, any other controlling agency to fill the vacuum. But this latter class is not very numerous; and if, without meaning any offense to them, their number is added to that of the criminal classes, to make up the aggregate of those who reject "the current creed," we have not a very large body compared with the whole body of persons in civilized communities who adhere to "the current creed," who live by it, and who think that others should live by it too, as the ultimate foundation of those social laws which take

cognizance of men's conduct toward one another. So that I do not quite understand the assertion that "moral injunctions are losing the authority given by their supposed sacred origin"; connected as it is with the other assertion that society is "rapidly progressing" to that vacuum which is to follow the complete rejection of the one guide without the substitution of another in its place. I am quite aware that there has been of late years an increasing amount of what is called infidelity, or unbelief, or atheism. But I am quite sure that there has not been a general theoretical or practical rejection of so much of the religious creed of mankind as assigns to the will of a supreme and supernatural lawgiver certain moral injunctions. If we confine our view to Christendom alone, it is certain that the growth, activity, and influence of the various religious bodies are not materially checked, and that religious beliefs are not by any means losing their hold upon great multitudes of people. If we survey the regions where the Mohammedan faith prevails, the same general result is found, whatever Christians may think of the beliefs or practices of that vast body of the human race. And, even when we penetrate among the races which are less civilized, we find very few races or tribes in which there does not prevail some idea of some kind of command proceeding from some deity or other, whatever we may think of the character of that deity or of the nature of the command.

But I presume that Mr. Spencer meant to confine his assertion of the necessity for a secularization of morals, and his assumption that their sacred origin is rapidly passing away from men's beliefs, to the state of society as it exists now in Western civilization; and my observation of this portion of the world is, that those who reject what I presume he means by "the current creed" are, first, a class of theorizers; and, secondly, the criminal classes; and that the aggregate of the two is not, after all, so formidable that

we ought to conclude that the regulative system of the sacred origin of moral injunctions is "no longer fit" for any practical purpose. I do not, therefore, recognize what he considers the supreme practical necessity for "the secularization of morals" to take the place of a system which is worn out.

KOSMICOS. You have left out of the case a very important element. Mr. Spencer antagonizes those who reject the current creed against those who defend it. The former, while they reject the current creed, do not recognize the necessity for any other controlling agency. The latter, while they defend the current creed, maintain that nothing can take its place as a regulating agency. Between them they create a vacuum, which one class wishes for and the other fears. This is the vacuum which he says can be and must be filled by the secularization of morals. It is a vacuum in philosophical speculation about the origin of morality, and, when the conclusion is reached, it becomes a practical and pressing question how it is to be carried out.

SOPHEREUS. Precisely ; and, when the conclusion is reached, it is to be carried out in legislation and government, or else the conduct of men toward one another in society is not to be regulated by public authority at all, but is to be left to each man's perception of what will produce the greatest amount of pleasure and happiness, or the least amount of pain and misery. Now, it is pretty important to settle at the outset whether those who defend the current creed are right or wrong when they say that nothing which will answer the same purpose can be found to take its place. They constitute one of the classes who will be responsible for the supposed vacuum ; and their share in that vacuum, their contribution to it, if I may use such an expression, consists in their assertion that nothing of any value can take the place of the sacred origin of moral injunctions. The practical test of whether they are right or wrong is to

be found in legislation. Let us suppose, then, a legislative assembly in which there is a proposal to change the law of murder, or to do away with it altogether. A member who does not believe in any sacred origin of the command "Thou shalt do no murder," moves not only to abolish the death-penalty, but to abolish all legal definition of the crime, and leave every man to be restrained by the consciousness that, if he takes the life of another, he will cause a great deal of pain and misery to the relations and friends of that person. The mover argues that "the current creed" of morality is worn out; is "no longer fit," as a regulator; and that the safest and best regulator is the perception of the beneficial effects of actions of kindness and good-will, and of the disastrous effects of cruelty and malice. He is answered by one who defends the current creed, and who maintains that, as human nature is constituted, the utilitarian system of morals can not take the place of the sacred origin as the ultimate foundation of social relations. But the majority of the assembly think that the mover of the proposition has the best of the argument, and they proceed to "secularize" morals by passing his bill doing away with the law of murder altogether. I am not obliged to extend my travels anywhere, where I do not care to go, and I confess I should not like to visit that country after it had thus "secularized" morality.

KOSMICOS. Now just be careful to note that this whole science of conduct—the science of ethics—the foundation of right and wrong, is a product of evolution. As in the development of organisms the higher and more elaborate are reached after a great length of time, as in mechanics knowledge of the empirical sort evolves into mechanical science by first omitting all qualifying circumstances and generalizing in absolute ways the fundamental laws of forces, so empirical ethics evolve into rational ethics by first neglecting all complicating incidents and formulating the

laws of right action apart from the obscuring effects of special conditions. There are thus reached, after a great lapse of time, those ideal ethical truths which express the absolutely right. Mr. Spencer treats of the ideal man among ideal men; the ideal man existing in the ideal social state. "On the evolution hypothesis," he says, "the two presuppose one another; and only when they coexist can there exist that ideal conduct which absolute ethics has to formulate, and which relative ethics has to take as the standard by which to estimate divergences from right, or degrees of wrong."* But, again, observe that society is now in a transition state; the ultimate man has not yet been reached; the evolution of ethics is, however, going on, retarded as it may be by various frictions arising from imperfect natures. But there is in progress an adaptation of humanity to the social state, and the ultimate man will be one in whom this process has gone so far as to produce a correspondence between all the promptings of his nature and all the requirements of his life, as carried on in society; so that there is an ideal code of conduct formulating the behavior of the completely adapted man in the completely evolved society.†

SOPHEREUS. But I understand that we have already reached, or are very soon to reach, a condition of things in which the supposed sacred origin of moral injunctions is now, or very shortly will become, no guide. We are to fill the vacuum which is caused, or is about to be caused, by its disappearance, by substituting as the standard of right and wrong the perceptions which we can have of the effects of actions upon the sum total of happiness, because this will be the sole standard in the ideal state of society in which the ideal man will ultimately find himself. I will not insist on the total depravity of man's nature,

* "Data of Ethics," chap. xv.

† Ibid.

because I never borrow an argument from theologians. But it has been one of the conclusions that I have drawn from some study of human nature, that it requires very strong restraints. Not only must some of the restraints be of the strongest kind, but they must be simple, positive, and adapted to the varying dispositions and intelligence of men. There can not well be imagined any restraining moral force so efficacious as that which is derived from a belief that the Creator of the universe has ordained some moral laws ; has specialized certain conduct as right and certain conduct as wrong, without regard to varying circumstances. As the foundation of all that part of legislation that takes cognizance of the simpler relations of men to one another—those relations which are always the same—the sacred origin of moral injunctions is of far greater force than the perception of the greatest-happiness principle can possibly be. If a man is tempted to commit murder, is he not far more likely to be restrained by a law which he knows will punish him without regard to the misery he would cause to the friends and relatives of the person whom he is tempted to kill, than he would be if the law were based on the latter consideration alone ? Do away with all legislation which punishes the simpler crimes first and foremost because they break the laws of God, and substitute as the restraining agency individual recognition of the effect of actions upon the sum total of happiness, and you would soon see that one of two consequences would follow : either you would have no criminal code at all, or it would be one that would be governed by the most fluctuating and uncertain standards. Moreover, how is the transition from the sacred source of the simpler moral injunctions to the secularization of morals to be effected ? I once heard a wise person say that if a thing is to be done, an ingenious man ought to be able to show how it is to be done. I suppose the secularization of morals means the complete

renovation of our ideas of right and wrong, by taking as the sole standard the pleasure or pain, the happiness or unhappiness, which actions will produce. How are you going to reach this ideal state? The vacuum is rapidly coming about. How are you going to take the first step in filling it? Before the vacuum is complete, you must do something. You have waited until the evolution of conduct of the purely utilitarian type has made some great advances; but the ideal state is not yet reached by all men. You wish to hasten its approach, and you must begin to act. There is nothing for you to do but to formulate the new moral code and put it in operation. You must make your laws—if you continue to have laws—so that murder and lying and theft will not be punished because the Almighty has prohibited them, but they will be punished simply because they produce misery. Do you think you would ever see every individual of such a community brought to an ideal congruity between all the promptings of his nature and all the requirements of his life, as carried on in society? That you would have nothing but “the completely adapted man in the completely evolved society”? I fancy that you would often have to fall back upon the sacred origin of moral injunctions, and to punish some conduct because it breaks a law of divine authority. I may have been too much in the habit of looking at things practically; but I have not yet discovered that the feeling of obligation, the sense of duty, what is recognized as moral obligation, having its origin in some command, and enforced by some kind of compulsion, can be dispensed with.

KOSMICOS. I must refer you to Mr. Spencer’s explanation of the fact that the sense of duty or moral obligation fades away as the moral motive emerges from all the political, religious, and social motives, and frees itself from the consciousness of subordination to some external agency. He does not shrink from the conclusion because it will be

startling. He tells us that it will be to most very startling to be informed that "the sense of duty or moral obligation is transitory, and will diminish as fast as moralization increases." He fortifies his position thus :

Startling though it is, this conclusion may be satisfactorily defended. Even now progress toward the implied ultimate state is traceable. The observation is not infrequent that persistence in performing a duty ends in making it a pleasure, and this amounts to the admission that, while at first the motive contains an element of coercion, at last this element of coercion dies out, and the act is performed without any consciousness of being obliged to perform it. The contrast between the youth on whom diligence is enjoined, and the man of business so absorbed in affairs that he can not be induced to relax, shows us how the doing of work, originally under the consciousness that it *ought* to be done, may eventually cease to have any such accompanying consciousness. Sometimes, indeed, the relation comes to be reversed ; and the man of business persists in work from pure love of it when told that he ought not. Nor is it thus with self-regarding feelings only. That the maintaining and protecting of wife by husband often result solely from feelings directly gratified by these actions, without any thought of *must* ; and that the fostering of children by parents is in many cases made an absorbing occupation without any coercive feeling of *ought* ; are obvious truths which show us that even now, with some of the fundamental other-regarding duties, the sense of obligation has retreated into the background of the mind. And it is in some degree so with other-regarding duties of a higher kind. Conscientiousness has in many outgrown that stage in which the sense of a compelling power is joined with rectitude of action. The truly honest man, here and there to be found, is not only without thought of legal, religious, or social compulsion, when he discharges an equitable claim on him ; but he is without thought of self-compulsion. He does the right thing with a simple feeling of satisfaction in doing it ; and is, indeed, impatient if anything prevents him from having the satisfaction of doing it.

Evidently, then, with complete adaptation to the social state, that element in the moral consciousness which is expressed by the word obligation will disappear. The higher actions required for

the harmonious carrying on of life will be as much matters of course as are those lower actions which the simple desires prompt. In their proper times and places and proportions, the moral sentiments will guide men just as spontaneously and adequately as now do the sensations. And though, joined with their regulating influence when this is called for, will exist latent ideas of the evils which non-conformity would bring, these will occupy the mind no more than do ideas of the evils of starvation at the time when a healthy appetite is being satisfied by a meal.

SOPHEREUS. There is a religion in the world called Christianity, with which we are tolerably familiar. It comprehends a system of morality which, when completely observed, develops the truly good man, the man who does the right thing with a feeling of satisfaction in doing it, and brings about those higher actions which are required for the harmonious carrying on of life, as matters of course, just as surely as the same result can be brought about by the most ideal secularization of morals that any philosophical theories can accomplish. Whatever may be the evidences by which the sacred origin of Christianity is supposed to be established, it is certain that this religion does not omit, but on the contrary it presupposes and asserts, as the foundation of its moral code, that the sense of obligation to which it appeals is the consciousness of obligation to obey divine commands. It proceeds upon the idea that human nature stands in need of some coercion; that the sense of obligation is not to be allowed to retreat into the background of the mind, but that a sense of the compelling power must be kept joined with rectitude of action, otherwise there will be a failure of rectitude. It is considered, I believe, that the adaptation of the Christian morality to the whole nature of man, by means of the compelling power, the consciousness of which is not to be transitory, but is to be universal and perpetual, is very strong proof that this religion came from a being who understood human nature

better than we can understand it. However this may be, it is, at all events, certain that the scheme of Christian morality proceeds upon the necessity for a more efficacious regulator of human conduct than the simple feeling of satisfaction in doing right, or the feeling of dissatisfaction in doing wrong ; and, although the true Christian is, in completeness of moral character, like Mr. Spencer's ideal man, and although a society completely Christian would be that ideal social state in which there would be perfect congruity between the lives of men and the welfare of that society, yet the Christian religion, if I understand it rightly, does not assume that there will be more than an approximation to that universal state of perfection while the human race remains on earth. The proof of this is to be found in the fact that this religion does not contemplate a time when divine command is to cease as the restraining agency on earth ; but, on the contrary, it appears to assume that obedience to the divine will is to continue in another life to be a perpetual motive, as it has been in this life. All this may be without such proof as "science" demands, but it is certain that the scheme of Christian morality is based upon the idea that the Creator has made obedience to his laws, because they are his laws, the great regulator of human conduct. If the Creator had so made men that the consciousness of the effect of conduct on the happiness or misery of our fellow-men would be sufficient as a regulator, it is rational to conclude that he would not have imposed commands which were to be obeyed because they are commands. However great may be the approximation to a complete adaptation of the social state, I do not look forward to the disappearance of that element in the moral consciousness which is expressed by the word obligation, because obligation, in its ultimate sense, is obedience to a higher power. Obedience for its own sake, obedience because there is a command, irrespect-

ive of all the reasons for the command, is a law which is illustrated in very many of the relations of life. A wise parent will sometimes explain to his child why he commands some things and prohibits others ; but if he means to train that child in the way he should go, he will sometimes require him to obey for the mere purpose of teaching him that obedience without question or inquiry is a law of his nature. A master of a vessel, which is in peril at sea, gives an order to the sailors. They may or may not understand the reasons for it. But what sort of sailors would they be if they did not act upon the consciousness that unquestioning obedience is the law of their relation to the ship ?

In the earliest traditions that we have of the human race, as those traditions are accepted by the Western nations, we find a pretty striking and very simple instance of this law of obedience. The first pair of human beings are placed in a garden where they are at liberty to eat of the fruit of every tree save one, but of that one their Creator absolutely forbids them to partake. He assigns to them no reason for the prohibition, but he lays upon them his absolute command, on the penalty of death if they are disobedient. One of them begins to reason about the matter—an allegorical creature or being, called the serpent, tempting her with certain advantages that she will get from eating this particular fruit. She yields, disobeys, and persuades her husband to do the same. The consequences follow, as their Creator told them they would. The law of obedience which this story illustrates has been in operation through all the ages, and society can no more dispense with it than it can dispense with any of the physical laws that govern the universe.

KOSMICOS. Are you going back to the fables for the sacred origin of moral injunctions ? I thought you had got beyond that.

SOPHEREUS. I use an illustration wherever I find it. I am perfectly content that you should call the story of Adam and Eve a fable, but the law of obedience which it illustrates is a tremendous fact. The incident, fable or no fable, is eminently human, and it is occurring every day in human experience. It is not strange that the first Hebrew tradition should have been one that illustrates in so simple a manner the existence of the law of obedience. In like manner, it is not strange that the Christian system of ethics should have been based on the existence of this same law of obedience to commands. This Christian system of ethics has dispensed with a great many minute observances which one branch of the Semitic race believed were imposed upon them as commands by their Creator; but it has not displaced the law of obedience, or dispensed with certain moral injunctions as divine commands, for it proceeds upon the great truth that human nature requires that kind of restraint, and that there are certain actions which can not be left without it.

KOSMICOS. Mr. Spencer has anticipated you. Your reference to Christianity is not happy. Having gone through with the explanation of the evolution process in the development of the highest conception of morals, and having shown that what now characterizes the exceptionally highest natures will eventually characterize all, he has something to say about the reception of his conclusions, to which, as you have referred to the Christian system of morals, you would do well to attend :

§ 98. That these conclusions will meet with any considerable acceptance is improbable. Neither with current ideas nor with current sentiments are they sufficiently congruous.

Such a view will not be agreeable to those who lament the spreading disbelief in eternal damnation, nor to those who follow the apostle of brute force in thinking that because the rule of the strong hand was once good it is good for all time; nor to those

whose reverence for one who told them to put up the sword is shown by using the sword to spread his doctrine among heathens. From the ten thousand priests of the religion of love, who are silent when the nation is moved by the religion of hate, will come no sign of assent; nor from their bishops who, far from urging the extreme precept of the Master they pretend to follow, to turn the other cheek when one is smitten, vote for acting on the principle—strike lest ye be struck. Nor will any approval be felt by legislators who, after praying to be forgiven their trespasses as they forgive the trespasses of others, forthwith decide to attack those who have not trespassed against them; and who, after a Queen's speech has invoked "the blessing of Almighty God" on their councils, immediately provide means for committing political burglary.

But though men who profess Christianity and practice paganism can feel no sympathy with such a view, there are some, classed as antagonists to the current creed, who may not think it absurd to believe that a rationalized version of its ethical principles will eventually be acted upon.

SOPHEREUS. "Our withers are unwrung." I am not a believer in eternal damnation; I am not an apostle of brute force; I am not in favor of using the sword to spread a religion of love; I am not a priest or a bishop, nor am I a member of Parliament or of any other legislative body. I am a simple inquirer, endeavoring to ascertain the soundness of certain systems of philosophy. If there are men who profess Christianity and practice paganism, I do not see that this fact should deter me from estimating the nature of the Christian religion, as I would endeavor to estimate the character of any other religion. It is no concern of mine whether men who profess Christianity and practice paganism can feel any sympathy with Mr. Spencer's views. The question for me is whether *I* can feel any sympathy with his views. I will, therefore, go on to tell you why I do not believe that a merely "rationalized version" of the ethical principles of Christianity will take the place of those divine injunctions on which the ethics of Christianity are

primarily based. Observe, now, that I do not enter upon the proofs of the divine authority or the divine nature of Christ. I point to nothing but the fact that the Christian ethics presuppose a divine and superhuman origin of moral injunctions. About the fact that they presuppose and assume the sacred origin of moral injunctions, there can be no controversy. We read that the question was put to Jesus, "What commandment is first of all?" and the answer was, "The first is, Hear, O Israel; the Lord our God, the Lord is one; and thou shalt love thy God with all thy heart, and with all thy soul, and with all thy strength. The second is this, Thou shalt love thy neighbor as thyself. There is none other commandment greater than these."* The person who made this answer may or may not have been a divinely commissioned teacher, but, whatever he was, the question that was put to him was a very searching one, and both question and answer assume two things: first, that there is a being, man, to whom commands are addressed; secondly, that there is a being, God, by whom commands are given. Jesus undertakes to inform those who questioned him, what are the two commandments than which there are none greater addressed to human beings; and in this answer he covers the existence of man as one being and the existence of God as another being. In any scheme of philosophy which ignores the existence of these two beings—ignores the existence of man as a being capable of receiving and acting upon a command, and the existence of a being capable of addressing a command to man—there must necessarily be a great defect; not because Jesus, a supposed divinely commissioned teacher, assumed that there are two such beings, but because without the hypothesis of their existence there can be no ethical system whatever. The crucial test of the soundness of Mr. Spencer's philosophy

* Revised version of St. Mark's gospel.

is, therefore, whether he negatives the existence of man and the existence of God.

Undoubtedly, there is a certain kind of consistency and completeness in Mr. Spencer's whole philosophy. Beginning with biology, he traces all organized life back to the original molecules of organizable matter, and he makes man, in his physical structure, a product of successive modifications of organisms out of one another, by simple generation. This ignores the Creator as a being specially fashioning the human animal, which Mr. Spencer thinks is a conception too grossly anthropomorphic to stand the slightest scientific scrutiny. He then takes up what he calls "psychology," and deals with what he considers the origin and nature of the human mind. He makes consciousness to consist in tracts of feeling in the nervous organization. He denies that mind is an entity, a being, perceiving and recognizing ideas suggested by the impressions produced upon the nervous organization by external objects. According to his psychological system, there is no *ego*, no person, no thinking being, behind the sensations and feelings in the nerve-center, and to whom the nerve-center suggests ideas. Rejecting the hypothesis of such a being, Mr. Spencer treats of the composition of mind ; and he makes it consist, not in a being, but in components of feelings produced by the molecular changes of which nerve-corpuscles are the seats, and the molecular changes transmitted through fibers. He does not regard the ultimate fabric of mind as a thing admitting of any inquiry. He says that its proximate components can be investigated, and that these are feelings and the relations between feelings. This "method of composition remains the same throughout the entire composition of mind, from the formation of its simplest feelings up to the formation of those immense and complex aggregates of feelings which characterize its highest development." Here, then, we must stop. We are not to conceive of mind

as an organized entity, or as an organism ; or as a something in which certain powers inhere, and which affords a field for their action. We may talk of a "thread of consciousness," meaning aggregates of feelings produced by successive waves of molecular change in the nerve-corpuscles, but we may not talk of "consciousness" as perception by a conscious subject. We may talk of feelings, but not of a subject that feels. Mind, then, is not an existence apart from physical organization. Its phenomena are products of our corporeal organization. Man is not a person ; and, if he is not, how he is to have a sense of obligation, how there is to be any intuitional idea of right and wrong, in the sense of a command or an injunction addressed by one being to another, I do not understand. Mr. Spencer does not help me to understand this, and obviously he does not intend to, because he denies it absolutely. His system of ethics plainly ignores it ; and to that I now pass.

He makes conduct consist in the adjustment of actions to ends. Good conduct is when the actions are adjusted to the ends of producing all the pleasure and happiness that they can be made to bring about. Bad conduct is when the actions produce only pain or misery to some one, or there is not a proper adjustment of them to the end of happiness. Beginning, as you described it in our last conference, with the lowest orders of animals, the conduct of man is the same adjustment of actions to ends that it is in them ; the difference being, in the case of man, that as an animal he has a greater and more varied power of complete adjustment of his actions to wider and more comprehensive ends than any other animal. These wider and more comprehensive ends consist in the full accomplishment of happiness and pleasure to other beings. This, according to Mr. Spencer, is impliedly admitted by those who assert the sacred origin of moral injunctions ; for, when pressed for the reason why moral injunctions have been given, all mor-

alists, he says, admit that the ultimate moral aim is a desirable state of feeling, gratification, enjoyment, happiness to some being or beings. That the welfare of society is *one* of the moral aims which moral injunctions of the sacred order were designed to accomplish, so far as special injunctions are believed to have been given, is plain enough. But that this congruity between the divine commands and the happiness of others—the useful effect of such commands—comprehends the whole purpose of such commands, is the ultimate and sole reason for their being given, so far as they are believed to have been given, may be disproved without difficulty. For example, an individual may be an utterly worthless person, a curse to his relatives and friends and to society, irreclaimably sunk in vice and misery, a mere lumberer of the ground. To kill him will produce no unhappiness to any one, but will be a positive relief and benefit. According to “the current creed,” there stands a sacred injunction, “Thou shalt do no murder.” This is accepted as an absolute, fixed, eternal canon of the divine will. You are not to take upon yourself individually to determine, by any standard of utility applied to a particular case, that you can rightfully kill a human being. A miser is alone in the world. I can steal his hoarded gold, and apply it to good objects. There stands the command, “Thou shalt *not* steal.” For no purpose, for no object whatever, for no end whatever, shall you commit a theft. “Society,” to borrow a phrase of one of the strongest men of our time, “would go all to pieces in an hour” if it were to adopt only the utilitarian standard of morality, and to reject the sacred origin of moral injunctions.* The reception of that sacred origin—the belief in it—implies that man is a being capable of receiving and obeying a divine command. The existence

* The late Jeremiah S. Black is the person whose language is here quoted, although it was used with reference to something else.

of such a being is negatived by Mr. Spencer's psychological system. That he equally negatives the existence of God as a being capable of giving, and who has given, moral injunctions to man, is apparent throughout his whole scheme of philosophy. According to that philosophy, there is nothing in the universe but an Omnipotent Power, which underlies all manifestations. To ascribe a personality to that Power is a relic of the primitive beliefs of barbarians, and it is one that is rapidly dying out of the conceptions of educated men.

There is, therefore, no room in Mr. Spencer's philosophy for any moral intuitions, such as are implied in the hypothesis that man was placed under an obligation to obey his Creator, and made capable of recognizing that obligation. I can perceive no other ultimate foundation for a system of ethics. As to the idea that we can make a system of ethics which is to relegate to individual judgment the adaptability of actions to produce complete happiness, and to have no other standard of right and wrong, we might as well at once act upon the maxim that the end justifies the means, and leave every man to determine that the end is a good one; and, therefore, the action is good.

KOSMICOS. How do you justify the death-penalty which is inflicted by society? Have you any justification for it, excepting the claim that it is a useful restraint?

SOPHEREUS. When society acts judicially in the punishment of crime, it inflicts such punishments as experience shows will prevent, or tend to prevent, others from committing that crime. Its authority to punish with death or some other penalty is founded, primarily, in regard to the simpler crimes, such as murder, theft, adultery, false testimony, etc., on the divine prohibition, which a belief in the sacred origin of certain special moral injunctions leads it to accept; and, secondly, on the general welfare

of mankind.* Eliminate from the ethical code all belief in the sacred origin of moral injunctions, and confine the judicial action of society to the merely utilitarian effect of individual conduct, and you will surrender the whole criminal code to the doctrine that the individual who does a certain act is to be punished or not to be punished, according to the effect of his act on the person or persons who are immediately or remotely affected by it. It is because of Mr. Spencer's negation of man's intuitive sense of obligation to obey divine commands, because of his peculiar system of "psychology," that I can not accept the system to which he gives the name of "ethics." He ought to have invented a new term for his science of mind. "Psychology," according to its derivation, and as it is used in the English language, means discourse or treatise on the human soul, or the doctrine of man's spiritual nature. If he has no spiritual nature, no soul, what does this philosopher mean by entitling his work "The Principles of Psychology"? It seems to me that in this use of a term which implies something that he labors to show does not exist, he is not quite consistent, for he certainly does not mean to admit that man has a soul, in the sense in which the learned world have generally used the term "psychology." But, not to stickle for verbal criticisms, I will endeavor to give you my conception of his "scientific" analysis of the mind, and to contrast it with the other analysis, which seems to me to be better supported.

KOSMICOS. Take care that you do not misrepresent him.

SOPHEREUS. I shall take the utmost care to represent him in the only sense in which I can understand him ; and, if I do not represent him accurately, you will correct me.

* This does not imply that the punishment inflicted by society is to be always the same. It implies only that there is to be some punishment, so long as the prohibited act continues to be committed.

Take, in the first place, the following passage, in which he defines the only *ego* that has any existence :

That the *ego* is something more than the passing group of feelings and ideas is true or untrue according to the degree of comprehension we give to the word. It is true if we include the body and its functions; but it is untrue if we include only what is given in consciousness.

Physically considered, the *ego* is the entire organism, including its nervous system; and the nature of this *ego* is predetermined: the infant had no more to do with the structure of its brain than with the color of its eyes. Further, the *ego*, considered physically, includes all the functions carried on by these structures when supplied with the requisite materials. These functions have for their net result to liberate from the food, etc., certain latent forces. And that distribution of these forces shown by the activities of the organism, is from moment to moment caused partly by the existing arrangement of its parts and partly by the envioning conditions.

The physical structures thus pervaded by the forces thus obtained, constitute that substantial *ego* which lies behind and determines those ever-changing states of consciousness we call mind. And while this substantial *ego*, unknowable in ultimate nature, is phenomenally known to us under its statical form as the organism, it is phenomenally known under its dynamical form as the energy diffusing itself through the organism, and, among other parts, through the nervous system. Given the external stimuli, and the nervous changes with their correlative mental states depend partly on the nervous structures and partly on the amount of this diffused energy, each of which factors is determined by causes not in consciousness but beneath consciousness. The aggregate of feelings and ideas constituting the mental *I*, have not in themselves the principle of cohesion holding them together as a whole; but the *I* which continually survives as the subject of these changing states is that portion of the Unknowable Power which is statically conditioned in special nervous structures pervaded by a dynamically-conditioned portion of the Unknowable Power called energy.*

* "Principles of Psychology," vol. i, pp. 503, 504, § 220.

It is now necessary to translate this ; and in translating it, it is necessary to attend to the meaning of words. Let us begin with the first proposition comprehended in this statement: "That the *ego* is something more than the passing group of feelings and ideas, is true or untrue according to the degree of comprehensiveness we give to the word. It is true if we include the body and its functions ; but it is untrue if we include only what is given in consciousness." The natural antithesis would have been to contrast what is included in the *body* with what is included in the *mind*. But as he does not admit that the mind is an existence, as there is nothing but a passing group of feelings and ideas, not a person who perceives feelings and has ideas, he speaks of *what is given in consciousness*, consciousness being nothing but that passing group, an ever-changing series, never the same, and never laid hold of and appropriated by a conscious subject. We do, indeed, call these ever-changing states of consciousness mind, but this is a misnomer, if we mean it in the sense of a being. What is to be considered, therefore, when the analysis seeks to ascertain the real and only *ego*, is the body and its functions, and the passing group of feelings and ideas which is given in consciousness.

Let us pass on : The body is the physical structure and its functions. It is pervaded by the forces which its functions liberate from the latent condition in which they exist in food and other environment. This physical structure, thus pervaded by certain forces, is the substantial *ego* which lies behind and determines the ever-changing states of consciousness which we call mind. There is no other *ego* than the body. It is phenomenally known to us under its *statical* form as the organism ; that is to say, when the body is contemplated as an organism which is not acting, or as a mere structure. But it is phenomenally known to us also under its *dynamical* form, which is when the energy

derived from the pervading forces is diffusing itself through the organism. Statical,* I understand, refers to a body at rest, or in equilibrium, not acting; dynamical refers to bodies in motion, or acted on by force, in movement. The human body is phenomenally known to us in both of these conditions or states. When it is in the dynamical state, that is, when it is acted on by external stimuli, there will be nervous changes; these nervous changes have correlative mental states, which depend partly on the nervous structure and partly on the amount of the diffused energy which pervades the organism. But these two factors, the nervous changes and the diffused energy, are each determined by causes that are not in consciousness, but beneath consciousness. This I understand to mean that when there are nervous changes from a state of rest or non-action, produced by external stimuli, and a certain amount of diffused energy pervades the organism, there will be correlative mental states, which are determined by factors that are not in consciousness but beneath consciousness. Consciousness, therefore, is not a perception by a conscious subject, or a consciousness of a self experienced by a being, but it is a passing group of feelings and ideas, which have no cohesion, are never the same, but are ever-changing successions of impressions produced in the physical organism.

I come now to the summary and conclusion of the whole matter as expressed in the last sentence of the paragraph which I have read. There is a mental I, but it is not a person, an existence, an independent *ego*. It is constituted of an aggregate of feelings and ideas, which have not in themselves a principle of cohesion that holds them

* *Statical*: pertaining to bodies at rest or in equilibrium.

Dynamical: pertaining to strength or power.

Dynamics: that part of mechanical philosophy which treats of bodies in motion; opposed to *statics*. ("Webster's Dictionary.")

together as a whole. They are merely passing groups of feelings and ideas which are never the same, but which succeed one another without connection or cohesion. There is an I which continually survives as the subject of these changing states, but it is that portion of the Unknowable Power which is statically conditioned in special nervous structures pervaded by a dynamically conditioned portion of the Unknowable Power called energy.

So that each individual of the human race is to be contemplated, not as a dual existence, composed of a body and a mind, united for a certain period, but as a subject which is continuously undergoing certain physical changes by the action through it of a portion of the energy exerted by the Unknowable Power. The Unknowable Power pulsates through my bodily organism a certain portion of its energy, and that of which continuous existence can alone be predicated is this portion of the Unknowable Power which is statically conditioned in my nervous structure, pervaded by a dynamically conditioned portion of that Unknown Power.

I trust, now, it will not be said that I misrepresent Mr. Spencer when I assert that he ignores, denies, and endeavors to disprove the existence of the mind of man as a spiritual entity, capable of surviving his body. Have you any fault to find with my paraphrase of the passage on which I have commented?

KOSMICOS. You have paraphrased that passage fairly enough, but you ought to attend to the proof which he adduces in support of his position in the subsequent passage to which he refers you in the one that you have quoted. Let me read it :

§ 469. And now, before closing the chapter, let me parenthetically remark on a striking parallelism between the conception of the Object thus built up, and that which we shall find to be the proper conception of the Subject. For just in the same way that the Ob-

ject is the unknown permanent *nexus* which is never itself a phenomenon, but is that which holds phenomena together; so is the Subject the unknown permanent *nexus* which is never itself a state of consciousness, but which holds states of consciousness together. Limiting himself to self-analysis, the Subject can never learn anything about this *nexus*, further than that it forms part of the *nexus* to that peculiar vivid aggregate he distinguishes as his body. If, however, he makes a vicarious examination, the facts of nervous structure and function, as exhibited in other bodies like his own, enable him to see how, for each changing cluster of ideas, there exists a permanent *nexus* which, in a sense, corresponds to the permanent *nexus* holding together the changing cluster of appearances referable to the external body.

For, as shown in earlier parts of this work, an idea is the psychical side of what on its physical side is an involved set of molecular changes propagated through an involved set of nervous plexuses. That which makes possible this idea is the pre-existence of these plexuses, so organized that a wave of molecular motion diffused through them will produce, as its psychical correlative, the components of the conception, in due order and degree. This idea lasts while the waves of molecular motion last, ceasing when they cease; but that which remains is the set of plexuses. These constitute the potentiality of the idea, and make possible future ideas like it. Each such set of plexuses, perpetually modified in detail by perpetual new actions; capable of entering into countless combinations with others, just as the objects thought of entered into countless combinations; and capable of having its several parts variously excited, just as the external object presents its combined attributes in various ways—is thus the permanent internal *nexus* for ideas, answering to the permanent external *nexus* for phenomena. And just as the external *nexus* is that which continues to exist amid transitory appearances, so the internal *nexus* is that which continues to exist amid transitory ideas. The ideas have no more a continued existence than we have found the impressions to have. They are like the successive chords and cadences brought out from a piano, which successively die away as other ones are sounded. And it would be as proper to say that these passing chords and cadences thereafter exist in the piano, as it is proper to say that passing ideas thereafter exist in the brain. In the one case, as in the other, the

actual existence is the structure which, under like conditions, again evolves like combinations.

It is true that we seem to have somewhere within us these sets of faint states answering to sets of vivid states which once occurred. It is true that in common life ideas are spoken of as being treasured up, forming a store of knowledge; the implied notion being that they are duly arranged and, as it were, pigeon-holed for future use. It is true that in psychological explanations, ideas are often referred to as thus having a continued existence. It is true that our forms of expression are such as to make this implication unavoidable; and that in many places throughout this work the phrases used apparently countenance it; though, I believe, they are always transformable into their scientific equivalents, as above expressed. But here, as in metaphysical discussions at large, where our express object is to make a final analysis, and to disentangle facts from hypotheses, it behooves us to recognize the truth that this popular conception, habitually adopted into psychological and metaphysical discussions, is not simply gratuitous, but absolutely at variance with experience. All which introspection shows us is that under certain conditions there occurs a state of consciousness more or less like that which previously occurred under more or less like conditions. Not only are we without proof that during the interval this state of consciousness existed under some form; but, so far as observation reaches, it gives positive evidence to the contrary. For the new state is never the same—is never more than an approximate likeness of that which went before. It has not that identity of structure which it would have were it a pre-existing thing presenting itself afresh. Nay, more; even during its presence its identity of structure is not preserved—it is not literally the same for two seconds together. No idea, even of the most familiar object, preserves its stability while in consciousness. To carry further the foregoing simile, its temporary existence is like that of a continuously-sounded chord, of which the components severally vary from instant to instant in pitch and loudness. Quite apart, however, from any interpretation of ideas as not substantive things but psychical changes, corresponding to physical changes wrought in a physical structure, it suffices to insist upon the obvious truth that the existence in the Subject of any other ideas than those which are passing, is pure hypothesis absolutely without any evidence whatever.

And here we come upon yet another phase of that contradiction which the anti-realistic conception everywhere presents. For setting out from the data embodied in the popular speech, which asserts both the continued existence of ideas and the continued existence of objects, it accepts the fiction as a fact, and on the strength of it tries to show that the fact is a fiction. Continued existence being claimed for that which has it not, is thereupon denied to that which has it.*

SOPHEREUS. The writings of Mr. Spencer, more than those of any other person of equal reputation that I have met with, require close examination in order to test the soundness of his propositions and assertions. Such a passage as the one which you have now quoted appears, on a first reading, to be quite plausible. When it is read carefully two or three times, and analyzed, it is found to be untenable in its reasoning, and largely made up of dogmatic assumptions. I shall now give you my reasons for this criticism. In the first place, let us go through the passage and fix the meanings of words. "Nexus," although not a term adopted into the English language, means, I presume, bond or ligament. "Plexus" is a word that we find in English dictionaries as a scientific term, and it means a union of vessels, nerves, or fibers, in the form of net-work.† Taking along these meanings, we find that the subject, the only thing of which a subjective existence can be predicated, is the ligament which holds states of consciousness together, and this permanent ligament is unknown. It is not itself a state of consciousness, but it is the bond which holds states of consciousness together. These states of consciousness are the ideas which are passing in the subject, which are never the same, which are not a permanent possession, and therefore there is in the subject no other existence than the passing ideas of the moment. Ideas, then,

* "Principles of Psychology," vol. ii, p. 484, *et seq.*

† "Webster's Dictionary." PLEXUS.

are not substantive things, but psychical changes, corresponding to physical changes wrought in a physical structure. The proof which is supposed to make this a tenable hypothesis consists of, first, what can be learned by self-analysis, or by my introspection of myself; next by vicarious examination, or by observing the facts of nervous structure and function exhibited in other bodies like my own. These examinations enable us to discover, what? Not a conscious person, learning, appropriating, and holding ideas, but that there exists only, for each changing cluster of ideas, a permanent *nexus*, corresponding to the permanent *nexus* which holds together the changing cluster of appearances referable to the external body. We next have the assertion that ideas have no more a continued existence than the impressions made in the external body. Both are transitory, and in both the only continued existence is the *nexus*, or ligament which binds together the changing impressions and the changing clusters of ideas. This Mr. Spencer illustrates by the successive chords and cadences brought out from a piano. These have no existence in the piano, which is nothing but a mechanical structure, giving forth sounds, when they are struck, which sounds are merely passing chords and cadences; and he concludes that it would be just as proper to say that the passing chords and cadences, after they have died away, exist in the piano, as it is to say that passing ideas, after the nervous impressions have ceased, exist in the brain. Let us now go back and examine this kind of psychology in detail. Mr. Spencer speaks of self-analysis, and of the analysis of other minds and bodies like our own. He uses the terms self, others, me, mine, him, his. Who or what is this thing which examines himself or another? Who and what are "you" or "I," who sit here talking to each other? Are these mere forms of expression, always transformable into their scientific equivalents? What is the scientific equivalent for he, his,

me, mine, you, yours ? Mr. Spencer says that, under certain conditions, there occurs a state of consciousness more or less like other states of consciousness that have existed before, but that the only permanent thing is the *nexus* which holds these states of consciousness together. His illustration of the piano fails. If the piano were a structure that could of its own volition give forth such sounds as it chose to utter, it might be correct to speak of it as an existence having a store of sounds which it could make reach our ears when and as it saw fit. But it does not happen to be an automatic machine. It is a mere collection of strings, of different sizes and tensions, which, when struck by an instrument called a hammer, cause certain vibrations in the air. But a human being is an automatic organism ; one that can at pleasure give utterance to ideas through the vocal organs, so that they are communicated to you. When I give utterance to an idea, through my vocal organs, in speaking to you, do I draw on a stock of permanent ideas, some of which I express, or do I express nothing but a passing state of consciousness, more or less like other states of consciousness that have before passed through my nervous organization ? Mr. Spencer asserts that the notion of the continued existence of ideas is absolutely at variance with experience. On the contrary, experience proves it every moment of our lives.

For example : Years ago a person related to me a fact very interesting and important to me, but I have not until now had occasion to make use of it. I have a perfect recollection of what he told me. It bears no resemblance to any other fact of which I ever heard. It concerns me alone. I have a perfect recollection of it. I stored it up for future use whenever I should need to use it. Is it a self-delusion that I have stored up and treasured this information ? When I recollect and repeat it, just as it was told me, am I doing nothing but giving expression to a passing idea,

more or less like the original idea ? This would be a rather dangerous doctrine to adopt as the interpretation of experience. Human testimony respecting things that we have been told, or have seen, would be a pretty uncertain reliance if the memory had no other power than to assimilate a passing idea, more or less, to a former state of consciousness which more or less resembled the present consciousness. Men deviate from the truth rather frequently, now ; but, teach them that memory is nothing but the assimilation, more or less, of a passing idea to some other idea that formerly passed through their heads, and I should be rather afraid of their testimony. I should fear that the "psychological changes" would be a little too frequent, and that the story would not have "that identity of structure which it would have were it a pre-existing thing presenting itself afresh."

What is all the learning of the scholar ? Has he treasured up nothing ? Has he nothing in the pigeon-holes of his mind ? Has he no mind in which to store his acquisitions ? Is the sole actual existence "the structure which, under like conditions, again evolves like combinations" ? Must he find himself under like conditions which will again evolve like combinations of ideas in passing trains of consciousness, before he can bring forth from the store-house of his mind the pre-existing thing that lies within it ?

KOSMICOS. I must here interject a question in my turn. What is the proof that ideas have a continued existence ? Speaking of the brain as the nerve-center, in which impressions are produced by molecular changes transmitted along the nerve-fibers, what proof is there that an idea which is now passing through the brain continues to exist there, any more than the passing chord or cadence continues to exist in the piano ?

SOPHEREUS. Do you not see that the very power of discrimination which we possess, whereby we distinguish be-

tween present and former conditions, and present and former combinations, proves that there is a permanent existing thing in an idea which presents itself afresh, and with which we compare the passing idea, so as to determine whether they are the same? If we did not possess this power, all thinking, all expression of ideas, all memory, all that part of consciousness which is not made up of mere bodily feelings and sensations, would be nothing but the repetition of the passing idea; and all learning, information, knowledge, and experience, would be utterly useless. If there did not exist something with which to compare the passing idea of the present moment, we should be always floating on the surface of the passing idea. There would be no continuity in our intellectual existence. We should be reduced to the condition of the piano, and could only give forth such chords and cadences as are produced by successive blows of the hammer upon the strings of the instrument. And how could anything originate in ourselves? What is the faculty which produces ideas that are not only new to ourselves, not only not suggested by passing ideas, but new to all other human intellects, and never embraced in their experience until we put them within their apprehension? What did Dante do when he produced the "Inferno"? or Milton, when he composed the "Paradise Lost"? or Shakespeare, when he composed his "Hamlet"? or Goethe, when he produced his "Faust"? Does the poet, when he gives us ideas that we never possessed before, originate nothing? If he is a maker, a creator, in the realm of ideas, are those original ideas, which neither he nor any one else ever had before, the mere result of like combinations evolved out of like conditions, when neither the old conditions nor the combinations have anything to do with the new ideas which he has produced? Surely, in reference to the great productions of human genius, we must contemplate the mind as an existence, having the power to do

something more than to produce the transitory ideas that are passing through the brain from the impressions on it, communicated through the nervous structure. Surely there is some other structure than that which can be likened to the piano. Surely there is something more than a set of plexuses "which constitute the potentiality of an idea, and make possible future ideas like it"; for there are possible future ideas which are not like any former ideas, which do not depend on any set of plexuses, and do not cease to be possible when the waves of molecular motion cease. These possible future ideas are the conceptions which the mind originates in itself; which are unlike anything that has gone before, or that is passing now. So that there are two kinds of ideas: the kind that has a continued existence, and that consists in knowledge, and is drawn upon by memory; and the other, the kind of which continued existence is not to be predicated until it has been formulated by the faculty of original production, not produced by an exercise of memory, but produced by original creation.

KOSMICOS. Has not Mr. Spencer allowed for and accounted for all that you claim as the power of originating new ideas? Does he not say that "each set of plexuses"—each set of the net-work of ideas—is "perpetually modified in detail by perpetual new actions"; is "capable of entering into countless combinations with others, just as the objects thought of entered into countless combinations; and capable of having its several parts variously excited, just as the external object presents its combined attributes in various ways"? Is not this the whole matter, in regard to what you call the power of originating new ideas?

SOPHEREUS. No, it is not. In the first place, I do not believe that he was here intentionally speaking of any ideas but those which are suggested by, or involve external objects. But, if he did mean to include the production of

new and original ideas through the countless combinations into which old ones may be made to enter, his theory does not fit the case of poetical invention of new ideas, or the invention of imaginary characters, or lives; for these are creations which are not mere combinations of old ideas, and the more they depart from everything suggested by, or resembling, former ideas, the more we are obliged to recognize as a faculty of the mind the power to originate and formulate new ideas that did not previously exist.

KOSMICOS. Well, you have criticised Mr. Spencer's mental philosophy from your point of view. Now let me hear your hypothesis of the origin and nature of mind, with which you promised to contrast his psychology, and which you think is better supported.

SOPHEREUS. I think I had better put my views in writing, and read them to you at our next meeting. You can then have them before you to examine at your leisure. Let me say in advance, however, that I shall not rely on any of the metaphysicians, but shall endeavor to give you my conception of the nature of mind from my own reflections, and from common experience. I shall make my examination of the nature of mind precede any suggestion of its probable origin, just as I think we should examine the structure of any organism before we undertake to deduce its probable origin.

Here, then, closes the debate between these two persons, from whom, at the end of the next chapter, I shall part with a reluctance which I hope the reader will share. Not for victory do I allow Sopherus to explain his analysis of mind, without describing how his scientific friend receives it.

CHAPTER XIII.

Sophereus discourses on the Nature and Origin of the Human Mind.

SOPHEREUS, in fulfillment of his intention expressed at their last meeting, reads to the scientist the following

DISCOURSE ON THE NATURE AND ORIGIN OF THE HUMAN MIND.

I regard the mind as an organism, capable of anatomical examination, as the body is, but of course by very different means. In the anatomical examination of an animal organism we use our eye-sight to acquire a knowledge of its component parts, its organs, and its structure, by dissection of a dead or inspection of a living subject. But, in studying the anatomy of mind, we have a subject that is beyond our visual perception. It is not, however, beyond our examination. We carry on that examination by means of the introspection which consciousness enables us to have of our own minds, and by observing and comparing the phenomena of mind as manifested in other persons. If these respective means of investigation enable us to reach the conviction that in each individual of the human race there is an existence of a spiritual nature and another existence of a corporeal or physical nature, we shall have attained this conclusion by observing the difference between the two organisms. The fact that we can not detect the bond that unites them while they are united should not lead us to doubt their distinct existence as organisms of

different natures, but made for a temporary period to act on and with each other.

Before entering further into the subject, I will refer to some of the terms which we are obliged to use in speaking of the nature of mind as an organism, when contrasted with the nature of the physical organism. We speak, for example, and from the want of another term we are obliged to speak, of the substance of mind. But, while we thus speak of mind in a term of matter, there is no implication that the subject of which we speak is of the same nature as that which constitutes the physical organism; nor is there any danger of the incorporation of materialistic ideas with our ideas of the fabric of mind. On the contrary, the very nature of the inquiry is whether that which constitutes mind is something different from that which constitutes body; and, although in speaking of both we use the term substance, we mean in the one case organized matter, and in the other case organized spirit. There is a very notable instance of a corresponding use of terms in the passage of one of St. Paul's epistles, where he discourses on the doctrine of the resurrection. According to my universal custom when I refer to any of the writings regarded by the Christian world as sacred, or inspired, I lay aside altogether the idea of a person speaking by divine or any other authority. I cite the statement of St. Paul, in its philosophical aspect, as an instance of the use of the term body applied to each of the distinct organisms. His statement, or assertion, or assumption—call it what you please—is, “If there is a natural body, there is also a spiritual body”;^{*} he uses the term *body* in speaking of that which is natural, or of the earth, earthy, and of that which is spiritual, or heavenly. Without following him into the nature of the occurrence which he affirms is to take place in the resurrection, the question is whether he was or was not philosophi-

^{*} Corinthians, revised version.

cally correct, in speaking of two kinds of organisms, one composed of matter, and liable to corruption and dissolution, and the other composed of spirit, indestructible and imperishable.

In order to be understood, he was obliged to use the term *body* in reference to both of these organisms, just as we are obliged to use the term *substance* when we speak of the subject of contemplation as a physical or as a spiritual organism. Can this distinctness of nature be predicated of the body and the mind of man before what we call death?

The peculiar occurrence which St. Paul so vigorously and vividly describes as what is to happen at the resurrection, is a prophecy in which he mingles with great force philosophical illustrations and the information which he claims to have received from inspiration; or things revealed to him by the Almighty through the Holy Spirit. He expresses himself in terms level to the apprehension of those whom he is addressing; and in this use of terms he does just what we do when we speak of a natural body and a spiritual body. He puts the existence of the natural body hypothetically:

“If there is a natural body, there is also a spiritual body.”* Paraphrased as the whole passage may be, he says, “You well know that there is a natural body, and I tell you that there is also a spiritual body.” Laying aside the mode in which the spiritual body is to be manifested at and after the resurrection, we have to consider whether, during this life, there is a bodily organism and a mental organism, distinct in their natures, but united for a time by a bond which is hidden from our detection.

* In the “authorized” version the passage is rendered thus: “There is a natural body, and there is a spiritual body.” Sopherus quotes the late revised version. The meaning is the same. St. Paul assumes the existence of a natural body, and then asserts that there is likewise a spiritual body.

I have used the term anatomy of the mind, from the same necessity which compels me to speak of the substance of mind. You will understand that, when I speak of anatomical examination of the mind, I mean that analysis of its structure which we can make by the use of the appropriate means, and which enables us to conceive that it is an organized structure of a peculiar character.

The grand difficulty with Mr. Spencer's "Psychology" is, that after he has made what he calls "the proximate components of mind" to consist of "two broadly contrasted kinds—feelings and the relations between feelings," which are mere impressions produced on the nerve-center by molecular changes in the fluid or semi-fluid substance of the nerves, he has not approached to a solution of the question whether there is or is not a something to which these feelings and the relations between them suggest ideas, and which holds ideas continuously for future use.

Thus he makes consciousness to consist in passing groups of feelings and their relations, and not in a conscious subject. He denies that there is any *ego*, in the sense in which every person is conscious of a self, and maintains that the only substantive existence is the unknown ligament which holds together the ever-changing states of feelings and impressions produced in the nerve-center. There is a far better method of investigation. It is to inquire into the fabric of the mind as an organism, by determining whether mental phenomena justify us in the conclusion that it is an organism. In this way we may reach a satisfactory conclusion that the mind is a substantive existence, possessing a uniform structure, of a character, however, fundamentally different from the bodily structure; and in this way we may be able to explain, wholly or in part, how the mind and the body act on and with each other so long as the connection is maintained.

I am entirely free to acknowledge that, when I speak

of the substance of mind, or speak of it as an organism, I am and must remain ignorant of the nature of its substance beyond the point where its self-manifestations cease. But the question is, whether we are not under an irresistible necessity of adopting as a postulate the existence of a something which has certain inherent powers, and whether the mental phenomena, the self-manifestations of those powers, do not necessarily lead us to the conception and conviction that mind is a substantive existence. I can not talk or think of consciousness apart from a conscious subject, or of feelings without a subject that feels. A thread of consciousness, or a series of feelings, conveys no meaning to me, apart from a being who has the consciousness and perceives the feelings.*

One very important question to be considered in all such investigations is, Whether our experience does not teach

* I have met, by the kindness of the author, with a little treatise which contains a great deal of sound mental philosophy, with which in the main I concur, and to which I am indebted for some very valuable suggestions. This modest little book is entitled "The Heart of Man: An Attempt in Mental Anatomy." The author is Mr. P. P. Bishop, a resident of San Mateo, in Florida. It was printed at Chicago, by Shepard & Johnson, for the author, in 1883. I know not if it is on sale. I suppose that Mr. Bishop was led to send me his interesting treatise by the publication, in the "Manhattan Magazine," at New York, in 1884, of the substance of the first three chapters of the present work. I take this opportunity of expressing my high appreciation of his treatise, and of explaining the meaning of its title. As I understand him, he uses the term "Heart of Man" as synonymous with structure of the mind, and not as referring to what is figuratively called "the human heart." He has explained "Mental Anatomy" as follows: "The method of investigation, which I have employed in making my way to the conclusions set forth in this discussion, I call 'The Anatomical Method,' because it is based on the conception of mind as an organized being, and aims to discover the structure of that being." . . . "At the risk," he adds, "of appearing egotistical, I think it best to relate an experience." He did not need to deprecate the appearance of egotism, for his method of investigation, based on his own mental experience, was the very best that he

us that we are mentally so constituted that certain conceptions are necessary to us? Our mental nature is placed under certain laws, as our physical or corporeal nature is placed under certain other laws. One of these necessary conceptions, which are imposed on us, as it seems to me, by a law of our mental constitution, is a conception of the fundamental difference between matter and spirit. In what way is it forced upon us that there is a natural world and a spiritual world? The phenomena of matter and the phenomena of mind are essentially different. In ourselves they occur in conjunction, and they occur in disjunction. They are manifested synchronously, and they are manifested separately in point of time. The normal action of all the functions of the body is not necessary to the action of the mind. The body may be prostrated by disease, and the moment of its death may be at hand; yet the mind, to the last moment of the physical life, may be unclouded, and its manifestations may be as perfect as they ever were in the full health and activity of the vital functions of the body. No one who stands at a death-bed where this phenomenon occurs, and observes how completely the mind is master of itself; how it holds in consciousness the past and the present; how it essays to grasp the future for those whom it is to leave and for itself, can easily escape the conviction that death is nothing but the dissolution of the bond which has hitherto held together the two existences that constituted the human being, one of which is to be dissolved into its elemental and material substances, and the other of which is to go elsewhere, intact and indestructible.

could have followed. It were to be wished that we could have more of this kind of self-analysis by persons competent to make it, and less of theoretical reasoning from premises more or less arbitrarily assumed.

I have endeavored to make my imaginary philosopher, Sphereus, avoid the method of reasoning which I thus condemn, and to keep him within the bounds of experience.

Let me now refer to what is taking place while I am writing this essay. I have said that the phenomena of our bodily organism and the phenomena of our mental organism may occur synchronously in the same individual. The act of writing an original composition is an instance of this. The action of certain organs of the body and the action of the mind are simultaneous. In time, they can not be separated. In themselves, they are separable and separate. The thought springing up in the mind may be retained there, or may flow into language and be written by the hand upon the page. No one can detect in himself any instant of time when the mental formation of a sentence, or any clause of a sentence, as he writes, is separable from the physical act of writing. In that not very common, but still possible, feat of dictating to two amanuenses, at what appears to be the same time, on two distinct subjects, there is undoubtedly an appreciable interval, in which the mind passes from one subject to the other, and then back again, with great rapidity. But, when one is one's own amanuensis, when the act of thinking and formulating the thought, and the act of writing it down in words, is performed by the same person, there is a simultaneous action of that which originates the thought and clothes it in words, and the act of the bodily organ which inscribes the words upon paper. How is this phenomenon to be explained? And to what does it lead? Is there anything in the whole range of Mr. Spencer's "Psychology" that will interpret this familiar experience? May it not be interpreted by an anatomical examination of the mind as an organism?

I do not now refer to cases where a thought is completely formulated before the pen begins to be moved over the paper, and is then recalled by an effort of the memory and written down. I am referring to what I suppose is the habit of many persons in writing, namely, the origination and formulation of the thought as the hand moves the pen,

a habit of which most practiced writers are perfectly conscious. The same thing occurs in what is truly called extemporaneous speaking,* when oral discourse is not a mere repetition, *memoriter*, of thoughts and sentences which had been previously formulated, but, as the word extemporaneous implies, when the thought and the language flow from the vocal organs *eo instanti* with their conception. In these and the similar cases of improvisation and animated conversation, in which there is a synchronous action of the mind and the bodily organs, it would be impossible for us to have that action if mind were constituted as Mr. Spencer supposes it to be. If there were no mind in the sense of an organized entity, conceiving a thought and clothing it in the language needful to give it written or oral expression, "if the *ego* were nothing more than the passing group of feelings and ideas"—if an "idea lasts (only) while the nerves of molecular motion last, ceasing when they cease"—if that which remains is (only) the "set of plexuses"—how could we originate any new thought? The very illustration to which Mr. Spencer resorts, when he likens the automatic human being to the non-automatic piano, and makes them analogous in their action, in order to show that passing ideas do not have a continual existence in the mind, but that the actual existence is the physical structure which, under like conditions, again evolves like combinations, reduces us at once to the level of the piano, and precludes the potentiality of a new and original idea which

* "Extemporaneous," Latin, *ex*, from; and *tempus*, time, at the same time, or from the same time. Extemporaneous discourse is when the thought and the expression in which it is clothed occur at the time it is uttered, or without premeditation of both thought and language. "Improvisation" means the same thing, but it is specially applied to the act of making poetry or performing music extemporaneously, that is, without prevision of what one is to say or sing. Rapid conversation is of the same nature. So is an instantaneous and unpremeditated answer to a question.

is not a combination of former ideas, and is produced under different conditions. The assertion or argument that each set of plexuses is capable of entering into countless combinations with others, and so renders possible future ideas, does not advance us one step to the solution of what takes place when we conceive a new thought, clothe it in language, and write it down on paper, or give it oral expression.

In justification of this criticism, let me now refer to that intellectual process which is called "invention," in its application to the mechanic arts. I do not mean to suggest or to claim that this kind of invention is an act which is to be referred to a distinct and peculiar faculty of certain minds, in the possession of which one man may differ from another. But I shall endeavor to describe what takes place when one conceives the intellectual plan of a certain new combination of mechanical devices, and embodies that plan in a machine which differs from all other previous machines in its characteristic method of operation. For convenience, I shall speak of the person who produces such a machine as the inventor, which is the same as speaking of him as the maker, as the poet is the maker of a poem. This act of invention, or the making of some concrete new thing, is an act of creation. The inventor, then, may be supposed to have learned all that empirical and all that scientific mechanics could teach him ; to have had any quantity of passing groups of ideas pass through his consciousness ; to be possessed of any number of plexuses capable of entering into countless combinations with others. These plexuses, or networks of transitory ideas, consisting of former impressions in the nerve-center, must, it is said, be recalled under the like conditions which produced them. But the conditions for the inventor are not the same. Something is to be produced into which the old ideas do not enter. There is to be a new arrangement of old mechanical devices ; a new

combination is to be made, which will possess a method of operation and accomplish a result never before seen or obtained. A new concrete thing, a new machine, is to be created. That the conception must be formed, that the objective point, to which the whole intellectual effort is to aim, must be seen, is manifest. A tentative intellectual process may have to be gone through before the full conception is reached, just as a tentative experimental process may be necessary in finding out how the practical embodiment of the conception is to be reached in building the structure. These processes may go on simultaneously or separately ; but, when they are both completed, when the new machine stands before us, we see at once that the plan is an intellectual conception, perfectly original, and the physical structure is a new arrangement of matter effected by the hand of the inventor or by the hands of others, which he uses as his instruments in doing the physical work. I do not know, therefore, how this phenomenon is to be explained upon the theory that the only *ego* is the body and its functions, which lies behind and determines ever-changing states of consciousness. I know not how else to interpret the phenomenon of invention, excepting to adopt the postulate that there is a mind, a substantive existence, which, while its consciousness holds ideas suggested by former conditions, has the inherent power to originate ideas that did not form a part of any previous state of consciousness.

I have spoken of mind as an organism and as a substantive existence. This is a deduction to be drawn from the manifestations of mental phenomena. In order to guard against an objection that may possibly be interposed in the way of this method of investigation, I will anticipate and answer it. It will be said that we can not define or describe the substance of mind ; can not tell whether it is a unit, in itself, or an aggregate of units ; we know and can know

nothing more than its approximate components, and all that we know of these does not justify us in assuming to speak of the substance of mind. I have more than once suggested, in our former conferences, that our inability to define and to describe the substance of any supposed existence is no proper objection to the hypothesis that there is such an existence. When we undertake to define matter, or to describe the substance of that which we call matter, we find that we soon reach a point where precise definition or description ceases. Yet we do not for that reason refrain from deducing the existence of matter from the manifestations of certain phenomena and from our experience with them. It is perfectly true that we know matter only by the manifestations of certain physical phenomena ; that we can not define the nature of its substance. All we can do, by the most minute analysis, is to arrive at the perception of the ultimate particles or units of matter ; and the nature of the substance of which these units are composed is incapable of any further description. "Matter"* is one of the words in the English language which are used in a great variety of senses, exact and inexact, literal and figurative. In its philosophical sense, meaning the substance of which all physical bodies are composed, the efforts of lexicographers to give a definition, descriptive of the nature of what is defined, show that definition is, strictly speaking, impossible. All that can be said is that matter is "substance extended" ; or that which is visible or tangible, as "earth, wood, stone, air, vapor, water" ; or "the substance of which all bodies are composed." But these efforts at definition express only what is needful to be expressed in contrasting matter with that other existence which is called "spirit." This is another word which is used in very different senses, but of which no more exact definition can be given, when it is used in its philosophical sense, than can be given of "mat-

* Webster's Dictionary—"Matter."

ter." Lexicographers have defined "spirit," in one of its meanings, as "the *soul* of man ; the intelligent, immaterial, and immortal part of human beings"; and in another of its meanings, more broadly, as "an immaterial, intelligent substance." In these definitions they have followed the metaphysicians, and the uses of the word in the English translation of the Bible. When we turn to the definition of "soul," we find it given as "the spiritual and immortal substance in man, which distinguishes him from brutes ; that part of man which enables him to think and reason, and which renders him a subject of moral government." We also have it defined as "the understanding, the intellectual principle." Undoubtedly these definitions involve certain assumptions, such as the existence of a substance called spirit, and the existence of an intellectual principle, of which "soul," "spirit," and "intellect" are mere names. But there is no difficulty in the way of our knowing what is meant when these terms are used. The difficulty of giving a definition without a circuitous use of terms, explaining the one by the other, and then explaining the last by the first, does not prevent us from having a definite conception of the thing spoken of. When we speak of mind, soul, or intellect, what we think of is the something in ourselves of which we are conscious, and whose manifestations we observe in other beings like ourselves ; and what we have to do is to examine the evidence which may bring home to our convictions the existence of this something that perceives, thinks, acts, originates new ideas ; holds former ideas in consciousness, is connected with and acts upon and is acted on by bodily organs, and is at the same time more than and different from those organs.

I have referred to some of the mental phenomena which have the strongest tendency to prove the existence of the mind as an organized entity. These are the phenomena

which occur in our waking hours, when the intellectual faculties and the bodily organs are in the full exercise of their normal functions respectively. There is another class of mental phenomena which may be said to be abnormal, in this, that the intellectual faculties and the bodily organs do not preserve the same relations to each other in all respects that they do when we are fully awake. These are the phenomena that occur during sleep—a class of mental phenomena of great consequence to be observed and analyzed in any study of psychology. They are of an extraordinary variety, complex in the highest degree, and dependent on numerous causes of mental and physical disturbance; but it is quite possible to extract from some of them certain definite conclusions.

Sleep, properly regarded, when it is perfect, is a state of absolute rest and inactivity of all the organs and functions of the body save the digestion of food and the circulation of the blood, and of all the mental faculties. Perfect sleep, sleep in which there is absolutely no consciousness, is more rare than those states in which there is more or less consciousness. But it is often an actual state of both body and mind, and it was evidently designed to renew the vigor of both, and to prevent the wear and tear of unbroken activity. Between absolute unconsciousness induced by perfect sleep and the full consciousness of our waking moments, there are many intermediate states; and the phenomena of these intermediate states present very strong proofs of the existence of the mind as a special and spiritual entity, capable in greater or less degree of acting without the aid of the physical organs. I do not except even the organ of the brain from this suspension of action during certain states when the mind is in more or less of activity; for I am convinced that in some of the mental phenomena to which I shall advert and which I shall endeavor to describe, the brain is in a state of perfect

sleep, and that in the production of those phenomena it takes no part. In other mental phenomena, which occur during sleep, the brain or some part of it is evidently acted upon by the mind, as in the somnambulistic condition, when the nerves of motion, responding to the action of the mind, communicate action to the muscles, and the body walks about and performs other external acts.

There are other mental phenomena occurring during very profound sleep of the body and its organs, when the mind does not appear to derive its action from the brain, or to be dependent on the brain for its activity ; when it is exceedingly active, and when it communicates action to none of the bodily organs ; when, for example, it carries on long trains of thought, composes sentences, invents conversations, makes poetry and prose, and performs other intellectual processes. Distributed into classes, the most important mental phenomena occurring during sleep are the following :

First, and presenting perhaps the strongest proof of the mind's independence of all the bodily organs, is that whole class of mental phenomena in which, during profound sleep of the body, we carry on conversations, compose original matter in the form of oral or written discourse, which we seem to ourselves to be producing, and solve intellectual difficulties which have baffled us when awake, or imagine that we receive from an unexpected source important information that we are not conscious of having previously received.

The phenomena of conversations, to which we appear to ourselves to be listening during sleep, or in which we appear to ourselves to be taking part, are, when analyzed, most remarkable occurrences, for it is the mind of the sleeper which originates the whole of what appears to be said by different persons. These conversations are as vivid, as much marked by different intellectual and personal charac-

teristics, sudden and unexpected turns, apt repartee, interchange of ideas between two or more persons, as are the real conversations which we overhear, or in which we take part, when we are awake. Yet the whole of what is said, or appears to us to be said, is the invention of the one mind, which appears to itself to be listening to or talking with other minds, and all the while the body is wrapped in profound sleep. This extraordinary intellectual feat, so familiar to us that it scarcely attracts our attention unless we undertake to analyze it, is closely akin to the action of the mind when the body and the mind are neither of them asleep, and when we invent a conversation between different persons. But this occurrence is marked by another extraordinary peculiarity : for it happens, during sleep, to persons who could not, when awake, invent and write such conversations at will, and who in their waking hours have very little of the imaginative faculty needed for such productions. I account for this phenomenon by the hypothesis that when the mind is free from the necessity of depending on the bodily organs for its action, as it is during profound sleep of the body, when its normal relations with the body are completely suspended and it is left to its independent action, it has a power of separate action. This, I think, accounts for a kind of mental action which, when compared with that which occurs in conjunction with the action of the bodily organs, may be called abnormal. Under the impulse of its own unrestrained and uncorrected activity, the mind goes through processes of invention, the products of which are sometimes wild and incoherent, sometimes exceedingly coherent, sensible, and apt. Let the person to whom this occurs be thoroughly awakened out of one of these states, and the mind becomes immediately again subjected to the necessity of acting along with, and under the conditions of its normal relations to the body.

Akin to this mental feat of inventing conversations,

during a sleep of the body, is the power of composing, during such sleep, oral discourse of one's own, or the power of composing something which we appear to ourselves to be writing. I suppose this is an occurrence which happens to most persons who are much accustomed to writing or to public speaking. It is often an involuntary action of the mind ; that is to say, it is sometimes accompanied with a distinct consciousness that it is a process that ought to be arrested because it is a dangerous one, and yet it can not be arrested before full waking consciousness returns. On goes the flow of thought and language, apparently with great success ; we seem to be speaking or writing with even more than our usual power, and all the while in the style that belongs to us ; but, until we are fully restored to the normal relation of the mind and the body, we can not at will arrest this independent action of the mind, but must wait until our bodily senses are again in full activity. I do not suppose that this phenomenon ought to be explained by the hypothesis that there are certain parts or organs of the brain which are specially concerned in the work of original composition of intellectual matter, and that these organs are not affected by the sleep that is prevailing in other parts of the brain. While it is doubtless true that there are special systems of nerves which proceed from or conduct to special parts of the brain, and by which action is imparted to or received from the other organs of the body, and while some of these special parts of the brain may be in the state of absolute inactivity called sleep, and others are not, I know of no warrant for the hypothesis that the intellectual operations or processes are dependent upon any particular organ or organs of the brain, as distinguished from those from and to which proceed special systems of nerves. If any person, who is much accustomed to that kind of intellectual activity which consists in original composition of intellectual matter, will attend to his own

consciousness, and probe it as far as he may, he will not find reason, I apprehend, to conclude that the power of thought and of clothing thought in language resides in any special part of the brain. His experience and introspection will be more likely to lead him to the conclusion that this power, whether it is exerted when he is asleep or awake bodily, is a power that inheres in the mind itself regarded as a spiritual existence and organism, and that the action of the brain, or of any part of it, is necessary to the exercise of this power only when it is necessary, as it is in our waking moments, to use some of the bodily organs in order to give the thought oral or written expression by giving it utterance through the vocal organs or by writing it down on paper. Certain it is that we conceive thoughts in more or less of connected sequence, and clothe them intellectually in language of which we have entire consciousness while the process is going on, without the action of any part of the body.

It may be objected to this view that the intellectual products which we seem to ourselves to be making when we are asleep would, if they could be repeated by an effort of the memory, word for word, just as they seem to have occurred, be found to be of the same incoherent, senseless stuff of which all dreams are made; and that this test would show that the brain is at such times not absolutely and completely in the condition which is called sleep, but that it is only partially in that condition; that it is performing its function feebly, imperfectly, and not as it performs that function when the whole body is awake. In reference to this hypothesis, I will repeat an anecdote which I have somewhere read, which is equally valuable whether it was an imaginary or a real occurrence.

A gentleman of literary pursuits, who was a very respectable poet, was subject to this habit of composition during sleep. One night he awoke his wife and informed

her that he had composed in his dream some of the best and most original verses that he had ever written. He begged her at once to get a candle, pen, ink, and paper, and let him dictate to her the new composition that appeared to him so striking. When they read together the new poem on the next morning, it turned out to be nonsensically puerile. But occurrences of this kind, if they could be multiplied, would prove only that we are liable to illusions in sleep, in regard to the comparative merits of our intellectual products, which we imagine ourselves to be creating when we are in that state, as we are in regard to other things. We are under a delusion when we imagine in our dreams that we encounter and converse with another person, living or dead. We are perhaps deluding ourselves when in sleep we compose or seem to compose an original poem. But what is it that deludes itself, either in respect to the interview with another person, or in respect to the new composition? Is it the brain, or is it the mind? Is it a person, or a bodily organ that has the false impression, in the one case or the other? There must be a something that is subject to an illusion, before there can be an illusion. If both brain and mind are in profound sleep, absolute suspension of all action, there can be no illusion about anything. If the brain is absolutely asleep and the mind is not, the illusion is in the mind and not in the brain. That the latter is what often occurs, the experience of the illiterate and uncultivated makes them aware, as well as the experience of the lettered scholar and the practiced writer.*

Under the same head, I will now refer to those strange but familiar occurrences which take place when there come to us, in sleep, solutions of difficulties which we had not

* "And it shall be as when a hungry man dreameth, and behold, he eateth: but he awaketh, and his soul is empty; or as when a thirsty man dreameth, and behold, he drinketh: but he awaketh, and behold, he is faint, and his soul hath appetite."—ISAIAH.

overcome by all our efforts while awake, and which appeared to us utterly dark when we lay down to rest. These mental phenomena are almost innumerable various. They take place in regard to all kinds of subjects, to lines of conduct and action, to everything about which our thoughts are employed ; and they are a class of phenomena within everybody's experience. There is scarcely any one to whom it has not happened to lie down at night with a mind distressed and perplexed about some problem that requires a definite solution, and to rise in the morning, usually after a night of undisturbed rest, with his mind perfectly clear on the subject, and with just the solution that did not come to him when he devoted to it all his waking thoughts. What is the explanation of this phenomenon ? If the mind is an independent entity, a spiritual organism, capable of its own action without the aid of the body under certain circumstances, this phenomenon can be explained. If the mind is not a spiritual organism, capable, under any circumstances, of acting without the aid of the bodily organs, this phenomenon can not be explained.

The most probable explanation is this : When we are awake, and devote our thoughts to a particular subject that is attended with great difficulties, we go over the same ground repeatedly—the mind travels and toils in the same ruts. Nothing new occurs, because we look at the subject in the same way every time we think of it. We are liable to be kept in the same beaten path by the associations between our thoughts and the bodily states in which we have those thoughts—associations which are exceedingly powerful. But let these associations be dissolved as they are during perfect sleep—let the mind be in a condition to act without being dependent on the brain or any other bodily organ for aid, or exposed to be hampered by the conditions of the body, and there will be a mental activity in which ideas will be wrought out that did not occur to us

while we were awake. The memory, too, may recall a fact which we had learned while awake, and yet we may be unable to recollect how it came to our knowledge. At such times, the fact is recalled; but as the mind is acting in a condition which is abnormal when compared with the waking condition, and is liable to delusions about some things, we imagine that the fact is revealed to us in some wild and supernatural way, as by a person who is dead and who has come to us to communicate it. There is a well-authenticated account of an occurrence of this kind, given by Sir Walter Scott in one of the notes to his "Antiquary," and on which he founds an incident related by one of the personages in his story. The real occurrence was this: A gentleman in Scotland was involved in a litigation about a claim asserted upon his landed estate. He had a strong conviction that his father had bargained and paid for a release of the claim, but he could find no such paper. Without it he was sure to be defeated in the suit. Distressed by this prospect, but utterly unable to see any way out of his misfortune, he lay down to sleep, on the night before he was to go into Edinburgh to attend the trial of the cause. He dreamed that his father appeared to him, and told him that the claim had been released, and that the paper was in the hands of a lawyer in a neighboring town, whose name the paternal shade mentioned.

Before going into Edinburgh on the next day, the gentleman rode to the place which his father had indicated, and found the lawyer, of whose name he had been previously unconscious. This person turned out to be an old man, who had forgotten the fact that he had transacted this piece of business for the gentleman's father; but on being told of the fact that his client had paid his fee in a foreign coin of a peculiar character—which was one part of the story which the father's apparition related to the son—he recalled the whole of the circumstances, searched for the

paper, and found it. The gentleman's estate was saved to him ; but he became very superstitious about dreams, and suffered much from that cause, as was quite natural. Sir Walter's solution of the whole affair is of course the correct one : "The dream was only the recapitulation of information which Mr. R—— had really received from his father while in life, but which at first he merely recalled as a general impression that the claim was settled. It is not uncommon for persons to recover, during sleep, the thread of ideas which they have lost during their waking hours."* Sir Walter makes another observation which is worthy of being repeated—that in dreams men are not surprised by apparitions. Why are we not ? Because the mind is in a state of abnormal activity, in which everything that occurs to it seems perfectly natural. The delusion in regard to the mode in which the very important fact was communicated to Mr. R—— in his dream, was substituted in the place of the actual communication made to him by his father during life. The latter he had wholly forgotten, and he had forgotten the circumstance of payment of the lawyer's fee in a peculiar coin, which had also been mentioned to him by his father when living. This remarkable incident, which might doubtless be paralleled by many similar occurrences, proves one of two things : either that the exercise of the memory is wholly dependent upon a waking condition of the brain, or that there may be an abnormal and imperfect act of memory while the brain is in profound sleep, in the course of which a fact becomes mixed with a delusion about the mode in which we are told of the fact. What happened to Mr. R—— was that his mind recalled the fact, but imagined that he then learned it for the first time from an apparition. I do not know how such a phenomenon can be explained, excepting by the hypothesis that

* Scott's "Antiquary," note v.

the mind is a special existence, which acts during sleep of the body upon facts that are lodged in the memory, but mixes them with imaginary and delusive appearances, so that the mode in which the fact was actually learned is obliterated from the memory, and some supernatural mode of communication takes its place. On the return of waking consciousness, the mode in which the fact was actually learned is still shut out from recollection, and, if the person to whom this kind of delusion has occurred is of a superstitious turn, he will act on what he has imagined was told him by the apparition, because he has no other means of rescuing himself from an evil.

In regard to the mental phenomena which occur without delusions or apparitions, where the thoughts on a difficult subject become clearer and more satisfactory to us when we awake from sleep than they ever were during our waking hours, I suppose the explanation is this : During profound sleep of the body, including the brain, there is an entire suspension of every bodily function excepting the digestion of food and the circulation of the blood. If there is excited in some of the other organs an action of a peculiar kind, by an excitation of the nerves connected with those organs, it is proof that the condition of perfect sleep is not prevailing in all parts of the brain. The state to which I now refer supposes a complete inactivity of the whole bodily organism save in the digestive function and the circulation of the blood. In such a state, the mind, that which thinks and reasons, does not act upon the brain, and is not acted upon by it. It is capable of thinking on any subject which has employed its thoughts during the waking hours ; and while, in some cases, it is visited by apparitions and subject to delusions, it is in other cases engaged in ideas that involve no delusive appearances. Freed from all the associations of these ideas with the feelings prevailing in the body when we think of the subject during

our waking hours, we are able to perceive relations of the subject which have not before occurred to us. When we pass from the condition of sleep to the full consciousness of our bodily and mental organism, we are intellectually possessed of these new relations of the subject, which we have brought with us out of the state in which we acquired them, and they furnish us with new materials for the solution of the problem that we had not solved when we lay down to rest. It is not, I am persuaded, because the mind was at rest during sleep, and when we become awake is by reason of that rest better able to grapple with the difficulties of the subject, that we do grapple with them successfully; for in the case supposed, which is a very common experience, the thoughts are actually employed on the subject, while the body and the brain are in the absolute rest and inactivity of all the organic functions excepting those of digestion and circulation of the blood. I do not know that it is possible to detect, in a person sleeping, an increased circulation of the blood to any part of the brain which may be supposed to be concerned in the act of thinking, and at the same time to know that thinking is going on, unless such an observation could be made of a person in the state called somnambulism, which is not the state of which I am now speaking. But reasoning upon the phenomenon which I have now described, according to all that we can learn from our own experience or from observation of others, I reach the conclusion that the mind, the thinking and reasoning entity, can and does, in profound sleep of the body and the brain, employ itself upon a subject that has occupied us when awake, and can perceive new relations of that subject, which had not before occurred to us, without the activity of any portion of the nerve-center which is called the brain. Does this hypothesis assume that our thoughts when asleep are more valuable than our waking thoughts? It does, to a certain extent and under

certain circumstances, for experience proves that in sleep we acquire ideas which we did not have before we fell asleep, and which we bring with us out of that condition.

That I have now given the true explanation of this familiar experience will appear, I think, from this consideration: There are very few nights when we do not in sleep have many thoughts. The states of perfect unconsciousness are comparatively rare. If the brain were never entirely asleep, if it were always engaged in the physical work of thinking—whatever that work may be—it would be worn out prematurely. But if the brain is perfectly at rest, while the mind is actively employed, the brain undergoes no strain and suffers no exhaustion; and the mind suffers no strain or exhaustion because it is in its nature incapable of wear and tear. It is only when the mind acts on the brain that exhaustion takes place. I speak now of what happens in states of ordinarily good health.*

* If it is objected that I have allowed Sopheus to overstate the power of the mind to deal better with difficulties after "a good night's sleep," as we say, than it had dealt with them before, I will cite the testimony of one of the most prolific of writers and one of the most self-observing of men, Sir Walter Scott, whose greatest success was achieved in the field of poetical and prose fiction. This is a department in which inventive genius is the main reliance, and is put to its greatest tasks. In that part of Scott's "Diary" which covers the year 1826—the period when he was writing "Woodstock"—he says:

"The half-hour between waking and rising has all my life proved propitious to any task which was exercising my invention. When I got over any knotty difficulty in a story, or have had in former times to fill up a passage in a poem, it was always when I first opened my eyes that the desired ideas thronged upon me. This is so much the case that I am in the habit of relying upon it and saying to myself when I am at a loss, 'Never mind, we shall have it at seven o'clock to-morrow morning.' If I have forgot a circumstance, a name, or a copy of verses, it is the same thing. . . . This morning I had some new ideas respecting 'Woodstock' which will make the story better." (Lockhart's "Life of Scott," vol. viii, chap. lxxviii.)

This, it is true, was the experience of a man of extraordinary genius,

I shall now refer to some of the very peculiar phenomena of somnambulism ; and in illustration of their various phases I shall resort to Shakespeare's picture of the sleep-

whose facility of invention was as marvelous as the ease and rapidity with which he wrote. But his experience was a very common one. It has been shared by persons of much more humble faculties. I am sure that persons in my own profession, who have been engaged in pursuits very different from those of the poet or the novelist, will, from their own experience, confirm what is assumed by Sphæreus as a well-known mental phenomenon. I could describe in detail many instances in which I have gone through with the same fruition of new ideas, resulting from the acquisitions obtained during sleep, or following from the benefits of sleep. For example, when having to do with a complex state of facts, needing orderly arrangement and analysis, it has repeatedly happened to me to rise in the morning after a night of undisturbed sleep, with the whole of an entangled skein unraveled, whereas before retiring to rest the mass of facts lay in some confusion in the mind. In like manner the mind can often deal with a legal question of a new and difficult character. The rule that ought to be applied to a particular case has to be extracted from many precedents, and perhaps none of them exactly cover the case in hand. On such occasions, if one refrains from pushing the study of his subject while awake to the severest analysis, and postpones the effort until the next morning, the experience of Sir Walter is very likely to be repeated. "It was always," he says, "when I first opened my eyes that the desired ideas thronged upon me." I am persuaded, therefore, that although in the study of any subject omission to master all its elements and details, when alone one can accumulate them, is not to be recommended, there is undoubtedly much to be gained by relieving the mind from the continued effort, and allowing some hours of sleep to intervene, during which the mind can act independently of all the bodily organs.

The question is, then, as above suggested, whether there come to us during sleep acquisitions of new ideas with or without a simultaneous consciousness that we are thinking of the subject, or whether the new ideas follow from the benefits of sleep as a state of absolute rest and inactivity of the brain, and of the intellectual faculties, so that when we awake both the brain and the mental powers are in greater vigor. The expression used by Scott in describing his own experience is that as soon as he awoke the desired ideas *thronged* upon him. This might happen upon the hypothesis that the desired ideas came because the brain and the mental powers, re-

walking of Lady Macbeth, which, although purely imaginary, is a most accurate exhibition of nature. Treating it, as we are entitled to treat it, as if it were a real occurrence at which we ourselves were witnesses, with a knowledge of her character and history, an analysis of the situation in which she was placed when the habit of somnambulism came upon her, and of the mode in which her mind acted upon her body, will enable us to see the phenomena in their true philosophical aspect. We may suppose ourselves present, with the doctor and the gentlewoman of her bed-chamber, when she comes forth in her night-dress and with a candle in her hand, and we witness the impressive scene of a disturbed mind overmastering the body while the body is asleep. It seems that, after the murder of Duncan, when she imbrued her own hands with his blood in smearing the faces of his sleeping grooms, the habit of sleep-walking had

freshed by sleep, were in greater vigor. But I incline to believe that his meaning was the reverse of this. At all events, it seems to me that the true explanation of the phenomenon is that during sound and undisturbed sleep of the body, including the brain, we do unconsciously think of the subject on which our waking thoughts had been previously employed; that in these states there are acquisitions of new ideas which we bring with us out of the state in which they were acquired, or, as Sir Walter expressed it, which *throng* upon us as soon as we open our eyes. While, therefore, it may be said that this hypothesis assumes the existence of the mind as a spiritual or intellectual entity capable of action as a thinking being without any action of the bodily organs, the question is, on the other hand, whether the phenomena here considered have not a very strong tendency to prove that the mind is such a substantive and independent existence. When it is remembered how common is the experience here referred to, how various the phenomena are, how they are manifested on all kinds of subjects, in regard to lines of conduct, and to everything about which we are perplexed, and when we add these peculiar phenomena to the other evidence which tends to establish the same belief in the existence of the mind as something entirely apart from all its physical environment, it seems to me that the argument becomes very strong, and that I have not made my imaginary philosopher press it beyond its legitimate bounds.

come over her. As we stand by the side of the awe-stricken witnesses, and hear their whispered conversation, we get the first description of her actions since the new king, Macbeth, her husband, whom she had instigated to murder the old king, went into the field. These first actions of hers, as described by the gentlewoman to the doctor, do not necessarily exhibit the working of a guilty conscience. They exhibit a mind oppressed and disturbed by cares of business and of state ; and they are a distinct class of the phenomena of somnambulism. The gentlewoman tells the doctor that "since his Majesty went into the field, I have seen her rise from her bed, throw her night-gown upon her, unlock her closet, take forth paper, fold it, write upon it, read it, afterward seal it, and again return to bed ; yet all this while in a most fast sleep." This is merely a description of what the witness has seen, and it might occur to any person of strong intellectual faculties, disturbed by great cares, without the action of a guilty conscience. It makes the situation real when the doctor recognizes the fact of this "great perturbation in nature ! to receive at once the benefit of sleep, and do the effects of watching." As they are whispering together, the doctor trying to make the gentlewoman tell him what at such times she has heard her say, which the loyal servant refuses to tell, Lady Macbeth moves forward, with the taper in her hand.

Here we may pause upon the first exhibition of the phenomenon called sleep-walking, which we get by description only, and analyze the nature of the action. It is perfectly apparent that what the poet accepted as true, is the power of the mind to move the body while the body is asleep, so as to make it perform many acts. Experience makes this assumption perfectly correct. I presume it will not be questioned that this phenomenon is described by Shakespeare with entire accuracy, and it is explicable only upon the hypothesis that the mind has some control

over the body while the body is asleep. Actions as minute and as much premeditated as those performed by Lady Macbeth "in a most fast sleep," have been witnessed in persons who were undoubtedly asleep, and whose eyes were open for some purposes, but, as in her case, their sense was shut for other purposes.

We now pass to the more awful exhibition of a mind worked upon by a guilty conscience. Lady Macbeth comes out of her bedroom fast asleep, but with a light in her hand. The gentlewoman who interprets her state to the doctor informs him that she has a light by her bedside continuously; and we thus learn that her nights are so disturbed that she can not bear darkness. They notice that her eyes are open, but "their sense is shut." Then begin the terrific manifestations of the control of a guilty conscience over both mind and body, when the memory, alive to certain terrible facts, plays fantastic tricks with itself, and mingles delusions with realities. As she approaches, with the taper in her hand, she performs an action which the gentlewoman says she has repeatedly seen her go through, for a quarter of an hour at a time, endeavoring to rub a spot of blood off from one of her hands. Her hands have been clean, physically, since the time when she first washed them on the fatal night; but the delusion that is upon her is that there is blood on them still. She goes on rubbing them, and her first exclamation is, "Out, damned spot! out, I say!" Yet it will not out. That little hand wears what she imagines to be an indelible stain. After her first exclamation, the memory rushes back to the moment before the murder. She thinks she hears, perhaps does hear, the clock strike—"one, two"; and then, as if speaking to her husband, she says, "Why, then 'tis time to do't." Then there is a pause, and out comes the reflection, "Hell is murky!" This seems to indicate that darkness, in which she and her husband are whispering together just

before the murder, is a hell, and so very fit for what is about to be done. Hell is murky, as this chamber is. Then she remembers her husband's reluctance, and fancying that she is still talking with him and bracing him up to the deed, she says : " Fye, my lord, fye ! a soldier, and afeard ? What need we *fear* who knows it, when none can call our *power* to account ? " Presently she is looking back upon the deed, and exclaims, " Yet who would have thought the old man to have had so much blood in him ! " Then she recurs to herself as if she were another : " The thane of Fife had a wife ; where is *she* now ? " Again she thinks of her stained hands : " What, will these hands *ne'er* be clean ? " Are they to wear this horrible stain forever ? Instantly she is again at the door of Duncan's chamber, speaking to her husband : " No more o' that, my lord, no more o' that : you mar all with this starting ! " Then her hands again, her poor hands ; they *smell* of the blood : " Here's the smell of the blood still : all the perfumes of Arabia will not sweeten this little hand ! Oh, oh, oh ! " Then, after another pause, she is speaking to her husband, when the deed has been done : " Wash your hands, put on your night-gown ; look not so pale ! " In another instant she is thinking of Banquo's murder, which occurred after Duncan's, and she says to her husband : " I tell you yet again, Banquo's *buried* ; he can not come out of his *grave* ! " Once more she is back at the door of Duncan's chamber, in the darkness, and the murder has been committed. Speaking to her husband, she says : " To bed, to bed ; there's knocking at the gate. Come, come, come, come, give me your hand. What's done can not be undone. To bed, to bed, to bed ! " Then she goes quickly toward her chamber and to bed, believing that Macbeth is with her and that she is holding his hand.

How mixed, how wild, how fantastic, how coherent and incoherent are these phantoms of the imagination ! If she

were awake, things would not thus present themselves to her. Every event in the dreadful story would stand in its true relations, and, however she might be suffering the pangs of a guilty conscience, she would not mix up the scenes through which she had passed, but every fact would stand in its due order. She would be conscious that there was no blood upon her hands, and that they did not need the perfumes of Arabia to sweeten them. She would know that Duncan had been murdered, and would not enact the murder over again. She would remember that Banquo's murder had not been distinctly made known to her, and that she had only surmised it, when at the banquet Macbeth fancied that the ghost of Banquo rose and sat at the table—an apparition which neither she nor any one else saw. But, in that strange scene, it flashed across her mind that Banquo was dead, and to herself she interpreted truly what was passing in her husband's mind, and instantly explained his conduct to the company as the recurrence of an old malady to which he was subject.

If we go back to what had actually happened before the banquet, and then go forward to the condition in which she is seen by the doctor and her attendant, we shall understand how her mind was working, not upon a fact that she knew, but upon a fact which she had truly surmised. In her somnambulistic state, she says to her husband : "*I tell you yet again*, Banquo's buried ; he can not come out of his grave." Had she said this to him before ? According to the course of the story, as the text of the play gives it to us, she had not. In the second scene of the third act, where, after Duncan had been murdered and Macbeth had become king, they are preparing for the banquet, to which Banquo was expected as one of the guests, Macbeth and his wife are talking together, and she is trying to get him out of the contemplative and conscience-stricken mood in which he looks back upon what they have done. He con-

cludes one of his mixed and melancholy reflections with these words :

Duncan is in his grave ;
After life's fitful fever he sleeps well ;
Treason has done his worst : nor steel, nor poison,
Malice domestic, foreign levy, nothing
Can touch him further !

Then she says to him :

Lady Macbeth. Come on ;
Gentle my lord, sleek o'er your rugged looks ;
Be bright and jovial 'mong your guests to-night.
Macbeth. So shall I, love ; and so, I pray, be you ;
Let your remembrance apply to *Banquo* ;
Present him eminence, both with eye and tongue :*
Unsafe the while, that we
Must lave our honors in these flattering streams ;
And make our faces vizards to our hearts,
Disguising what they are.

Just at this moment, therefore, he is not thinking of killing Banquo, but wishes him to be received with all honor. But, in answer to his last reflection on the hypocritical part that they must act, she says to him :

You must leave this.

Then bursts forth the terrific oppression of his soul :

Macb. Oh, full of scorpions is my mind, dear wife !
Thou know'st that Banquo, and his Fleance, *lives*.
Lady M. But in them nature's copy's not eterne.†
Macb. There's comfort yet ; they are assailable ;
Then be thou jocund : ere the bat hath flown

* Do him every honor.

† By some commentators, this hint, given with female subtilty, is explained to mean that their copy-hold, or lease, by which Banquo and his son hold their lives, is not eternal. The more probable meaning is that, if they are cut off, nature will produce no more copies of their race. But in either meaning the hint that she gave was the same, and it included both Banquo and his son.

His cloistered flight; ere, to black Hecate's summons,
The shard-borne bettle, with his drowsy hums,
Hath rung night's yawning peal, there shall be done
A deed of dreadful note!

She affects not to understand him—perhaps does not—
and she asks :

What's to be done?

Macb. Be innocent of the *knowledge*, dearest chuck,
Till thou applaud the *deed*. Come, seeling night,
Skarf up the tender eye of pitiful day;
And, with thy bloody and invisible hand,
Cancel, and tear to pieces, that great bond
Which keeps me pale!—Light thickens; and the crow
Makes wing to the rooky wood;
Good things of day begin to droop and drowse;
While night's black agents to their prey do rouse.
Thou marvel'st at my words: but hold thee still;
Things bad begun make strong themselves by ill:
So, prithee, go with me.

[*Exeunt.*]

In the next scene, the murderers, previously engaged by Macbeth, waylay Banquo in the park as he is approaching the castle, and kill him, his son Fleance and a servant escaping. Then follows the banquet, Macbeth himself moving about at first, and then he takes a seat at the table lower down. One of the murderers comes in and whispers to him what has been done. The stage direction is, "The ghost of Banquo rises and sits in Macbeth's place." As no one at the table but Macbeth sees this apparition, it might be inferred that it is the force of his imagination which presents the spectacle to him, as Lady Macbeth supposes, when she says to him :

O proper stuff!

This is the very painting of your fear:

This is the air-drawn dagger, which, you said,
Led you to Duncan.

But the stage direction must be taken as a literal ap-

pearance of the ghost, so as to make it visible to the audience, while it is invisible to all at the table excepting Macbeth himself.

If, now, we go forward to the night when Lady Macbeth is walking in her sleep, and remember what had occurred previous to and at the banquet, we see how, without any actual previous knowledge that her husband intended to have Banquo killed, and with only the surmise that he had been killed, which comes to her at the banquet, she came to say to her husband, in her dream :

I tell you yet again, Banquo's buried ; he can not come out of his grave.

Here we have a fact lodged in the mind during the waking hours, and in sleep wrought into a strange mixture with the killing of Duncan, with which it had in reality no connection, having transpired afterward. This is very strong proof of the capacity of the mind to act during sleep without the action of the brain. The mind of the guilty sleep-walker is filled with horrible memories, which it can not shut out, but with which it can not deal in their actual order and true relations, because the sequences of thought, during sleep, are abnormal. Those whose experience has never involved any such workings of conscience are perfectly aware of the fact that in dreams ideas that are separately lodged in the consciousness become entangled with each other in the most fantastic manner. Lady Macbeth at one moment even thinks of herself as if she were some one else, and asks, Where is the woman now who was the wife of the thane of Fife ? Every one has experienced in sleep the same projection of one's self out of one's own consciousness ; so that we seem to be contemplating ourselves as if we were a different person.

The phenomena that occur during the delirium of fever, where the normal consciousness is lost for the time being,

are in some respects analogous to and in some respects different from those which occur during the somnambulistic condition. Delirium occurs when the body and the brain are not in the condition of sleep ; but the senses of perception convey false impressions to the mind, and the mind itself has temporarily lost its power of correcting its own action by its former experience. The nearest friends who are around the bedside are not recognized by the sufferer ; they appear to be strangers, and the patient talks to them as if both they and he were not their real selves. It would seem that we can safely infer from the state of delirium a suspension of the direct and normal connection between the brain and the mind ; that neither of them can act, in relation to the other, as they both act when there is no such disturbance ; but that this condition, so far from proving or tending to prove that the mind is not an independent spiritual existence, has a strong tendency to prove that it is. Insanity, on the other hand, is probably a derangement of the mental organism akin to derangement of the physical organism, but not necessarily connected with or induced by the latter, for the bodily health of the insane is often entirely sound while the mind is in an entirely unsound and irrational condition. But the phenomena of insanity are too various and multiform, and too much dependent on both physical and moral causes, to afford any satisfactory proofs of the postulate which I propound in this essay. The safest line of investigation is that which I suggested in the first instance, namely, to regard the mind as an organism, and to ascertain whether it is susceptible of anatomical examination in a sense analogous to anatomical examination of the bodily organism. All that I have hitherto said is useful by way of preliminary illustration of my main hypothesis. It has a strong tendency to show that the mind, instead of consisting, as some philosophers now suppose, of the products of a material organism, is itself an organized

being with a definite structure and capable of living a life of its own, although at present dwelling in a corporeal organism which affects it in various ways while the connection lasts. The theory that all mental phenomena are products of our corporeal organism is one that appears to derive great support from examinations of the structure of the brain and of the whole nervous system. The physical anatomy of man exhibits very striking illustrations of the influence of corporeal changes upon the mental state, as the mental changes show corresponding influences upon the corporeal state. But, then, there are undoubtedly phenomena that are purely and exclusively mental ; and therefore when we undertake to solve these mental phenomena by the materialistic hypothesis we find a sense of inadequate causation confronting us so directly that we are compelled to look for a solution elsewhere. It is certain that things take place in the inner recesses of our minds, in the production of which the bodily senses not only render no aid, but in which they have no part whatever. It is necessary, therefore, to carry our investigations into a class of mental phenomena in which all physical causation ceases to afford an adequate guide to a conclusion.

It will not be denied that the products of material organisms can be proved to consist of matter and of nothing else. Their presence can be detected by some physical test. For example, if it be true that all animals have been evolved from protoplasm, the organisms are simply changes in the form of a certain portion of matter. If, in an individual organism having a highly developed nervous structure, there are actions produced by an excitation of the nerves of sensation, those actions are simply molecular changes in the matter comprising the sensitive and easily moved substance of the nerve-fibers. However far and into whatever minutiae we carry our investigations into organized matter, we find that its products remain material, and that

they consist only of changes in the material substance of a material organization. But, when we pass from such material products into the domain of purely mental phenomena, are we warranted in saying that, although the latter are not, properly speaking, *products* of the material organization, they are *effects* corresponding to and dependent upon the excitation of the nerves of sensation? This last hypothesis must assume one of two things: either that there is a distinction between those corporeal feelings which do not and those which do produce mental changes or mental effects, or, if there are corporeal feelings which produce corresponding mental states and mental action, there must be a something on which the effects can be wrought, and this something must be an independent organism. It is doubtless true that there are many corporeal feelings which are followed by no very important mental effects, especially during a sound state of bodily health. But it is equally true that, if there are corporeal feelings which influence our mental action, there must be an organism which is capable of being so influenced; and our experience and consciousness teach us that there is such a difference between corporeal feelings and mental phenomena that the probability of a difference in the originating causes becomes very great. We know that the mind can and does act with great force when bodily suffering is extreme; that it has an energy of its own which enables it to rise above all the power of physical pain to restrain or influence it. I must therefore follow out, as I had originally projected, my anatomical analysis of the mind as an independent spiritual organism.

In order to arrive at a correct conclusion concerning the structure of mind, we must first observe that there are four special corporeal organs by which the capability of the mind to receive impressions from matter is acted upon. It is through these means that the properties of matter, or those properties which can make themselves known to us,

become known to us. The senses, as they are usually called, are sight, hearing, smell, and taste. The external organ of each of these senses is furnished with a set of nerves, the function of which is to transmit from that organ a wave of molecular motion along the fluid or semi-fluid substance inclosed in the nerve-tubes to the great nerve-center the brain, the central recipient of all such motions. Such, at least, is the theory, which may be accepted as a fact. But, then, the question remains, What is the intellectual perception or mental cognition of the idea suggested by one of these supposed transmissions of a wave of molecular motion? Is there a being, a person, a spiritual entity, conceiving the idea or having an intellectual perception of it? Or is there no such being, and while we attribute to the office of the nervous system the function of producing certain feelings or sensations in the brain, do these sensations or feelings constitute all that there is of consciousness?

It is impossible for me to conceive of consciousness as anything but an intuitive sense of his own existence, experienced by a being capable of such an experience, because endowed with such a faculty. It is certain that when we so regard consciousness we are not deceiving ourselves; for if any one will consider what would happen to him if he should lose this faculty of being sensible of his own existence, he will see that in the event of that loss he could neither distinguish himself from other persons, nor have any control over his own actions, or any cognition whatever. For this reason, the theory on which I made some criticisms in one of our late conversations is the one with which I contrast my conception of mind. If that theory fails to satisfy a reflecting person in regard to the nature of consciousness, as certified to him by his own experience, the hypothesis that the mind is an extended and organized being, of which a conception can be formed, and not an

unextended and unorganized something of which no conception can be formed, must be accepted as the alternative.

I explained in our former discussion my understanding of Mr. Spencer's theory of the only *ego* that can be scientifically recognized ; and, in order to encounter it by my own hypothesis, I will here restate its substantial position in a condensed form.

By the *ego* of which he treats, I understand him to mean all that we can arrive at by an analysis of what takes place in the body and its functions, and of "what is given in consciousness." This phrase—"what is given in consciousness"—reveals to us his purpose to reduce consciousness from a self-conviction and cognition of one's own existence to a mere passing group of feelings, which constitute "the ever-changing states of consciousness" that we "*call* mind." So that, when we speak of mind, we mean and can mean nothing more than certain states of feeling produced in our brains by perpetually changing impressions. We do not and can not mean that there is a person who perceives and holds ideas suggested by external objects through the action of his nervous system. All that we know about any *ego*, any mental I, is that there is a physical structure, pervaded by certain physical forces, that produce "consecutive states," which Mr. Spencer calls "*mental states*"; and the aggregate of the feelings and ideas which thus constitute the *mental states* is the only *ego* of which any continued existence can be predicated. But even these aggregates of feelings and ideas have, according to this philosopher, no principle of cohesion holding them together as a whole ; and, therefore, all that we can assume as having any continuously surviving and durable existence is the changing *states* produced by the action through us of a certain unknowable power, statically conditioned in our nervous organism, which is pervaded by a dynamically con-

ditioned portion of that unknowable power which is operating everywhere in nature, and is called "energy."*

So far as this theory is based upon the existence of a physical organism, whose functions liberate from the food supplied to it certain forces, which are distributed by the activities of the organism, we may accept it as a statement of what actually takes place in the form of physical phenomena. But when we follow the physical phenomena of the diffused energy into its action upon the brain, by the transmission of an impulse, we must stop with the effect of that impulse upon a corporeal organ, or we must go further and find a something which receives into itself and appropriates to itself the idea the elements of which the impulse has transmitted. The presence of that something in ourselves may be illustrated by its absence from a mechanism in which we know that it does not exist, but which appears superficially to be animated by an intelligent principle possessing volition. We stand, for example, before one of those automatic machines which perform actions that seem to be guided by a living spirit. They are mere physical organisms, constructed without the principle of life that inhabits animal organisms, but they are so admirably contrived for the production of certain limited but complex movements that they suggest the presence of a spiritual being acting as we ourselves act. But the least reflection upon what we see makes us aware that there is nothing before us but a mechanical organism, in which the artisan who made it has availed himself of certain forces of nature and properties of matter, whereby he uses a portion of the energy that pervades the universe. There is nothing within the machine to which this energy communicates ideas that are to

* When the unknowable power ceases to pulsate through our physical organism, this "mental state" ceases—nothing survives—continuity is ended.

be the subject of its future voluntary operation. All is comprehended in a fixed mechanical operation of certain machinery, and, when we have analyzed and understood the physical phenomena, we can follow them no further, because there is no translation of the physical energy into mental phenomena. But in ourselves there is such a translation, and we must follow it into the mental phenomena. So following it, we find ourselves in the presence of a something which has a self-conscious individuality, and which, by a mysterious bond of connection, is so united with a physical organism that it is capable of receiving, appropriating, and preserving the ideas which the physical organism was designed to produce in it.

My objection to Mr. Spencer's system of psychology may be summed up in what I shall now say upon his chief position, which is that "an idea is the psychical side of what, on its physical side, is an involved set of molecular changes, propagated through an involved set of nervous plexuses." Translated into what I take to be his meaning, the assertion, or hypothesis, is this: An idea is the mental cognition of an external object, as, for example, a tree. When we are looking at or thinking of a tree, we have a mental cognition of a tree; and this idea of a tree is said to be the psychical side of that which on its physical side has been transmitted to our brain by molecular changes through our visual nerves. The idea of the tree is the psychical correlative of a wave of molecular motion diffused through our organs of vision; and the conception of a tree thus becomes a possible conception. But why did not the learned philosopher follow the wave of molecular motion until he found the impression of the object which the visual organs have transmitted to the brain, or the nerve-center, translated into a thought by an intelligent being, capable, by its own organization, of having that thought? Why does he speak of an idea as the psychical

side of what, on its physical side, is one and the same thing? Obviously, because he meant to ignore the psychical or mental existence as an independent existence, or as any existence at all. Now, there is no way in which the psychical side and the physical side can be bridged over, excepting by the hypothesis that the mind is an entity of a peculiar nature, different in structure from the bodily organism, but capable, by the connection between them, of receiving and transmuting into thought the impressions which the waves of molecular motion transmit to the brain from the external object. To say that the set of plexuses, or networks, which hold together the waves of molecular motion, constitute the potentiality of the idea and make possible future ideas like it, explains nothing. The potentiality of the idea, or the possibility of ideas like it, depends upon the existence of a something which is capable of conceiving the idea, holding it, and reproducing it to itself, after the waves of molecular motion cease. I call this a process of translation, or transmutation, because there is no other convenient term for it. It is a process analogous to the physical assimilation of food by the organs of physical digestion, with this difference, however, that the action of the mental organism in the assimilation of ideas is the action of a spiritual and intellectual organism upon materials that are brought within its reach by the means of communication with the external world afforded by the physical senses and the nervous system. The image of the tree produced upon the retina of the eye by the lines of light that proceed from every point of that object is the food which the mind assimilates and transmutes into the idea of the tree; and this may remain as a permanent mental perception or cognition, although the object itself may have been seen but once. If seen many times, the various aspects in which it has been seen are transmuted into so many distinct ideas. If many kinds of trees, of

different shapes and dimensions, have been seen, the varieties become a part of our consciousness in the several degrees of their precise resemblances and differences which we happen to have observed, when the different impressions were produced upon the retina. Can there be any doubt that this is the process by which the infant begins to acquire ideas of external objects, and that, as adolescence goes on and the powers of sense expand with the growth and exercise of the physical organs, there is a corresponding growth and expansion of the mental powers?

This hypothesis of the progress of mental growth, *pari passibus* with the growth of the physical organism, brings me to the consideration of one of those specimens of Mr. Spencer's peculiar logic, in a passage in which he undertakes to disprove the existence of mind as anything more than what he calls the psychical side of physical impressions. He is treating of the impossibility of our "knowing" anything about the substance of mind; and he propounds this impossibility in the following logical formula:

. . . To know anything is to distinguish it as such or such—to class it as of this or that order. An object is said to be but little known when it is alien to objects of which we have had experience; and it is said to be well known when there is great community of attributes between it and objects of which we have had experience. Hence, by implication, an object is completely known when this recognized community is complete; and completely unknown when there is no recognized community at all. Manifestly, then, the smallest conceivable degree of knowledge implies at least two things between which some community is recognized. But, if so, how can we know the substance of mind? To know the substance of mind is to be conscious of some community between it and some other substance. If, with the idealist, we say that there exists no other substance, then, necessarily, as there is nothing with which the substance of mind can be even compared, much less assimilated, it remains unknown; while, if we hold with the realist that being is fundamentally divisible into that which is present to us as mind,

and that which, lying outside of it, is not mind, then, as this proposition itself asserts a difference and not a likeness, it is equally clear that mind remains unclassable and therefore unknowable.

The answer to this supposed insuperable dilemma may be made by determining what we mean when we speak of knowing a thing. Definition of knowing is here essential, and the first inquiry we have to make is whether, in order to know mind, it is necessary to find and recognize some community between the substance of mind and some other substance? The statement is, on the one hand, that there exists no other substance with which the substance of mind can be compared, much less assimilated, and therefore there is no aid to be derived from resemblance; or, on the other hand, that, if being is fundamentally divisible into something which is mind and something which is not mind, we depend for a knowledge of mind on a difference, and not on a likeness, and we have no means of knowing that difference. Upon either proposition, mind remains unclassable and therefore unknowable.

It may be conceded that our knowledge of the properties and forms of matter consists in recognizing a community or a difference between things which belong to the same class, so that there is a comparison between things which are of the same substance. But what is to prevent us from classifying the substance of mind, when the fundamental idea of its substance is that it is something which resembles no other substance, but constitutes a class or description of being that stands entirely by itself, and in which, for a knowledge of its properties we distinguish its properties from those of any other substance? The only difficulty that arises here springs from the fact that we have but one word—substance—by which to speak of the two existences that we call mind and matter; just as we can only speak of an organism when we speak of the natural body and the spiritual body. But this use of the same

term to express things which in our consciousness stand fundamentally opposed to each other does not prevent us from discriminating between the means by which we become conscious of the two things, or from classifying the knowledge which we have of mind as something distinct from the knowledge which we have of matter.

We must discriminate between the means by which the properties of matter become known to us and the means by which the properties of mind become known to us. In both cases there is knowledge, but it is knowledge of a different kind ; it is obtained by different means ; and we must therefore recognize a fundamental difference between the substance of mind and the substance of matter. It is true that our knowledge of the properties of matter and our knowledge of the properties of mind are alike in this, that in both cases it is knowledge by one and the same person ; but the distinction is that, in the one case, I have knowledge of objects external to myself, and, in the other case, I have knowledge of myself as the person possessing knowledge of external objects. The knowledge that we have of ourselves is what most persons mean by consciousness, and it is what we should scientifically understand by that term, although consciousness is often used as synonymous with mental cognition of things external to ourselves, and as cognition of ourselves also.

I shall now quote from the chapter in which Mr. Spencer makes a special synthesis of reason, and in which he denies the existence of the commonly assumed *hiatus* between reason and instinct, maintaining that the former is the continuation of the latter, because, as he thinks, the highest forms of psychical activity arise little by little out of the lowest and can not be separated from them. The passage which I shall now analyze is this :

“ Here seems to be the fittest place for pointing out how the general doctrine that has been developed supplies

a reconciliation between the experience-hypothesis as commonly interpreted and the hypothesis which the transcendentalists oppose to it.

“The universal law, that, other things equal, the cohesion of psychical states is proportionate to the frequency with which they have followed one another in experience, supplies an explanation of the so-called ‘forms of thought,’ as soon as it is supplemented by the law that habitual psychical successions entail some hereditary tendency to such successions, which, under persistent conditions, will become cumulative in generation after generation. We saw that the establishment of those compound reflex actions called instincts is comprehensible on the principle that inner relations are, by perpetual repetition, organized into correspondence with outer relations. We have now to observe that the establishment of those consolidated, those indissoluble, those instinctive mental relations constituting our ideas of space and time, is comprehensible on the same principle.

“For, if, even to external relations that are often experienced during the life of a single organism, answering internal relations are established that become next to automatic—if such a combination of psychical changes as that which guides a savage in hitting a bird with an arrow becomes, by constant repetition, so organized as to be performed almost without thought of the processes of adjustment gone through—and if skill of this kind is so far transmissible that particular races of men become characterized by particular aptitudes, which are nothing else than partially organized psychical connections; then, if there exist certain external relations which are experienced by all organisms at all instants of their waking lives—relations which are absolutely constant, absolutely universal—there will be established answering internal relations that are absolutely constant, absolutely universal. Such relations we have in

those of space and time. The organization of subjective relations adjusted to these objective relations has been cumulative, not in each race of creatures only, but throughout successive races of creatures ; and such subjective relations have, therefore, become more consolidated than all others. Being experienced in every perception and every action of each creature, these connections among outer existences must, for this reason, too, be responded to by connections among inner feelings that are, above all others, indissoluble. As the substrata of all other relations in the *non-ego*, they must be responded to by conceptions that are the substrata of all other relations in the *ego*. Being the constant and infinitely repeated elements of thought, they must become the automatic elements of thought—the elements of thought which it is impossible to get rid of—the ‘forms of intuition.’

“Such, it seems to me, is the only possible reconciliation between the experience-hypothesis and the hypothesis of the transcendentalists, neither of which is tenable by itself. Insurmountable difficulties are presented by the Kantian doctrine (as we shall hereafter see) ; and the antagonist doctrine, taken alone, presents difficulties that are equally insurmountable. To rest with the unqualified assertion that, antecedent to experience, the mind is a blank, is to ignore the questions : Whence comes the power of organizing experiences ? Whence arise the different degrees of that power possessed by different races of organisms, and different individuals of the same race ? If, at birth, there exists nothing but a passive receptivity of impressions, why is not a horse as educable as a man ? Should it be said that language makes the difference, then why do not the cat and the dog, reared in the same household, arrive at equal degrees and kinds of intelligence ? Understood in its current form, the experience-hypothesis implies that the presence of a definitely organized nervous system is a

circumstance of no moment—a fact not needing to be taken into account! Yet it is the all-important fact—the fact to which, in one sense, the criticisms of Leibnitz and others pointed—the fact without which an assimilation of experiences is inexplicable.

“Throughout the animal kingdom in general the actions are dependent on the nervous structure. The physiologist shows us that each reflex movement implies the agency of certain nerves and ganglia; that a development of complicated instincts is accompanied by complication of the nervous centers and their commissural connections; that the same creature in different stages, as larva and imago, for example, changes its instincts as its nervous structure changes; and that, as we advance to creatures of high intelligence, a vast increase in the size and in the complexity of the nervous system takes place. What is the obvious inference? It is that the ability to co-ordinate impressions and to perform the appropriate actions always implies the pre-existence of certain nerves arranged in a certain way. What is the meaning of the human brain? It is that the many *established* relations among its parts stand for so many *established* relations among the psychical changes. Each of the constant connections among the fibers of the cerebral masses answers to some constant connection of phenomena in the experiences of the race. Just as the organized arrangement subsisting between the sensory nerves of the nostrils and the motor nerves of the respiratory muscles not only makes possible a sneeze, but also, in the newly born infant, implies sneezings to be hereafter performed, so, all the organized arrangements subsisting among the nerves of the infant's brain not only make possible certain combinations of impressions, but also imply that such combinations will hereafter be made, imply that there are answering combinations in the outer world, imply a preparedness to cognize these combinations, imply faculties of

comprehending them. It is true that the resulting compound psychical changes do not take place with the same readiness and automatic precision as the simple reflex action instanced ; it is true that some individual experiences seem required to establish them. But, while this is partly due to the fact that these combinations are highly involved, extremely varied in their modes of occurrence, made up, therefore, of psychical relations less completely coherent, and hence need further repetitions to perfect them, it is in a much greater degree due to the fact that at birth the organization of the brain is incomplete, and does not cease its spontaneous progress for twenty or thirty years afterward. Those who contend that knowledge results wholly from the experiences of the individual, ignoring as they do the mental evolution which accompanies the autogenous development of the nervous system, fall into an error as great as if they were to ascribe all bodily growth and structure to exercise, forgetting the innate tendency to assume the adult form. Were the infant born with a full-sized and completely constructed brain, their position would be less untenable. But, as the case stands, the gradually increasing intelligence displayed throughout childhood and youth is more attributable to the completion of the cerebral organization than to the individual experiences—a truth proved by the fact that in adult life there is sometimes displayed a high endowment of some faculty which, during education, was never brought into play. Doubtless, experiences received by the individual furnish the concrete materials for all thought. Doubtless, the organized and semi-organized arrangements existing among the cerebral nerves can give no knowledge until there has been a presentation of the external relations to which they correspond. And, doubtless, the child's daily observations and reasonings aid the formation of those involved nervous connections that are in process of spontaneous evolution, just as its daily

gambols aid the development of its limbs. But saying this is quite a different thing from saying that its intelligence is wholly *produced* by its experiences. That is an utterly inadmissible doctrine—a doctrine which makes the presence of a brain meaningless—a doctrine which makes idiotey unaccountable.

“In the sense, then, that there exist in the nervous system certain pre-established relations answering to relations in the environment, there is truth in the doctrine of ‘forms of intuition’—not the truth which its defenders suppose, but a parallel truth. Corresponding to absolute external relations, there are established in the structure of the nervous system absolute internal relations—relations that are potentially present before birth in the shape of definite nervous connections, that are antecedent to, and independent of, individual experiences, and that are automatically disclosed along with the first cognitions. And, as here understood, it is not only these fundamental relations which are thus predetermined, but also hosts of other relations of a more or less constant kind, which are congenitally represented by more or less complete nervous connections. But these predetermined internal relations, though independent of the experiences of the individual, are not independent of experiences in general: they have been determined by the experiences of preceding organisms. The corollary here drawn from the general argument is that the human brain is an organized register of infinitely numerous experiences received during the evolution of life, or, rather, during the evolution of that series of organisms through which the human organism has been reached. The effects of the most uniform and frequent of these experiences have been successively bequeathed, principal and interest; and have slowly amounted to that high intelligence which lies latent in the brain of the infant—which the infant in after-life exercises and perhaps strengthens

or further complicates, and which, with minute additions, it bequeaths to future generations; and thus it happens that the European inherits from twenty to thirty cubic inches more brain than the Papuan. Thus it happens that faculties, as of music, which scarcely exist in some inferior human races, become congenital in superior ones. Thus it happens that out of savages unable to count up to the number of their fingers, and speaking a language containing only nouns and verbs, arise at length our Newtons and Shakespeares." *

The learned philosopher has here dealt with two hypotheses, neither of which he considers tenable by itself. The first is that the individual mind, anterior to experience, is a blank; that at birth there exists nothing but a passive receptivity of impressions, which become organized into intelligence by experience. The other hypothesis is that of the transcendental school, which attributes the growth of intelligence wholly to implanted intuitions, which become expanded by the increase of mental power. His argument is put thus: If at birth the mind of the individual is a blank, and it becomes capable of thought or possessed of intelligence by experience, beginning with a passive receptivity of impressions, and going on to their organization into intelligence by the repetition of experiences and their increasing complexity—why, he asks, is not a horse as educable as a man? Why do not the cat and the dog, reared in the same household and hearing human beings use language every moment of their lives, arrive at equal degrees and kinds of intelligence? In the first place, as a matter of fact, many animals are educable beyond their natural capacity of intelligence, or beyond the point at which they would arrive without such education, to a very remarkable degree. I have heard a credible de-

* "Principles of Psychology," i, § 208, pp. 465-471.

scription of a dog which would ascend to a chamber and bring down an article that he had been told to bring. Many repetitions of the command and the performance had taught the animal to associate the name of the article which he was to bring down with the act which he was to perform. While I am writing, a bear beneath my window is going through performances, at the word of command, of very considerable varieties ; actions which he would not do if he had not been trained to do them. The trained war-horse knows the meaning of the different airs played on the bugle upon the battle-field or the parade-ground, and instantly charges or wheels about, without waiting to be prompted by the bit or the spur. Insects can be trained, to some extent, in the same way ; birds to a much greater extent. Is the explanation of these capacities to be found in a definitely organized nervous system as the all-important fact without which an assimilation of experiences is inexplicable ? Grant that, as we advance from creatures of very low to creatures of very high intelligence, we find a vast increase in the size and complexity of the nervous system taking place through the series, until we arrive at its highest and most complex development in man. What is the hypothesis which explains the difference in mental power between man and all the other creatures below him in the capability of co-ordinating impressions and performing the appropriate actions ? It is, according to Mr. Spencer, that the capability implies the existence of certain nerves arranged in a certain way ; that where this arrangement does not exist the capability is not found ; and where it exists in only a low degree the capability exists only in the same degree. As two parallel and concurring facts these may be conceded. But why are not these facts entirely consistent with another hypothesis, namely, that to each creature, along with its specially organized nervous system, there has been given by divine appointment a certain de-

gree of innate mental power, to explain which we must follow the impressions produced in the nervous system into their transmutation into intelligence, until we arrive at the limit of that intelligence? Mr. Spencer's answer to this inquiry is twofold: first, that the experience-hypothesis, in the case of the individual creature, or the constant repetition of the impressions and the appropriate actions, is insufficient to account for what takes place, without recognizing the fact that the actions are dependent on the nervous structure, without which the impressions would not be followed by the actions; second, that the nervous structure in the different races of animals has come to be what it is in each race by gradual modifications and increments through the process of evolution of organisms out of one another, and that these accumulations have resulted in the human brain, which has the highest power of co-ordinating the impressions and performing the appropriate actions. Then he puts, with an air of final solution, the question, "What is the human brain?" which he answers in his own way.

His mode of answering this question is that the brain is an organ with established relations among its parts, which stand for so many established relations among the psychical changes. I understand this to mean, that as the human brain, in the process of animal evolution, has come to have certain constant connections among the fibers of the cerebral masses, each of these connections answers to some constant connection of phenomena in the experiences of the race. His corollary is that the human brain is an organized register of infinitely numerous experiences received by the race during the evolution of life, or during the evolution of that series of organisms through which the human organism has been reached. Each infant of the human race, to whom has descended this improved and perfect brain, has latent in that organ a high capacity for intelligence. This it begins to exercise and strengthen and further compli-

cate as life goes on, and at the end of twenty or thirty years the individual brain is fully developed, and this development, or capacity for development, the individual bequeaths with minute additions, principal and interest, to future generations. In different races of men the cubic bulk of the brain varies greatly, according to the size transmitted from ancestors; and so certain faculties which scarcely exist in some races become congenital in others; and whereas the remote ancestors of all of us were savages, incapable even of conceiving of numbers, and possessing but the rudest elements of language, there have at length arisen our Newtons and Shakespeares.

This hypothesis leads me to ask a question and to state a fact. The question is, What is it in the infant of the most developed and cultivated race that constitutes the high intelligence which is said to lie latent in his brain? In other words, is there nothing in that infant, or in the adult which he becomes, but a brain and a nervous system of a highly organized and complex physical structure adapted to receive impressions on itself from without? Are the experiences which have been enjoyed by the progenitors of the human infant or by preceding organisms registered in his brain, and is his capacity of intelligence dependent on his having inherited the same or nearly the same volume of brain as that which was possessed by his progenitors? And does the intelligence consist, in degree or in kind, in nothing but a repetition of the same experiences as those through which his progenitors were carried, or is there a something in him to which his individual experiences contribute the mental food by which the mind is nourished and by the assimilation of which its individual intellectual growth becomes possible?

It is not necessary to question the fact that individuals of great intellect, the Newtons and the Shakespeares, have had or may have had large brains; or the fact that, as be-

tween races of men, the most intelligent have brains of greater cubic measure than the less intelligent. But it has not always been found that individuals of superior intellect have had comparatively larger brains than other individuals, nor that those who have had very large brains have transmitted them to their children. The important fact to which I meant to advert is that, since we have known much about the human brain and the nervous system connected with it, it has not been found that, in its several parts and in the action of the nerves connected with it, it has been differently organized and acted upon in the lowest savages from what we know of it in the European and the most civilized races. There is a difference in volume, but not in the organization or the office of the brain in different races of men, as there is in different individuals of the same race. The fact that all men, since they became a completed type of animal, however they originated and became men, have possessed a capacity to become in different degrees intelligent and thinking beings, points strongly to the conclusion that while in each individual there is a nervous system so organized as to transmit impressions from external objects to the central physical organ called the brain, there must be another existence in that individual, of a spiritual and intellectual nature, of a substance that is not physical, to which the brain supplies the materials of thought, thought being mental cognition of an idea. If I am asked for the proof of such an existence, I answer that the proof is consciousness, as I define it, and this I conceive is the highest kind of proof.

One may appeal to the convictions of mankind for an answer to the question, What is the highest and most satisfactory kind of knowledge that any of us possess? The most intelligent man may be mistaken in that part of self-knowledge that relates to his own character or motives. Others may see him very differently from the light in which

he sees himself, and they may be right and he may be wrong. He may think, too, that he knows a great deal that he does not know ; but no intelligent man is mistaken or in any way deluded when he believes in his own existence. No man in his waking moments and in his right mind ever confounded his own identity, as we have seen that Lady Macbeth did when she was walking in her sleep, with the identity of another person. No man in his right mind loses the constant, ever-present sense of himself as a being and as one distinct from all other beings. The reason is that his own existence is certified to him by the most unerring of witnesses, one who can not lie, because the fact of one's own existence is the fact of which that witness must speak. Of all other facts the witness may speak falsely. The mind can not speak falsely when it speaks to us of our own existence, for the witness who speaks and the person spoken to are one and the same. The falsehood, if there could be a falsehood, would be instantly detected.

As the mind certifies to itself its own existence by the most direct and the highest kind of proof, so it certifies to itself the powers with which it is endowed ; and this brings me to the anatomical examination of the structure of the mind. I shall not make this analysis a very minute one, but shall confine it to those distinct elementary powers which are constituted by systems, as the powers of the bodily organism are constituted by systems distinguishable by the functions which they perform. In the bodily organism we recognize the digestive system, the system of circulation of the blood, the muscular system, the nervous system, the sensory system, which is distributed into the different organs of sense, the male and female systems of sexual generation, and the female system of gestation. These several systems, acting together as one complex mechanism endowed with the mysterious principle of life, form in each

human being of either sex the physical existence of the individual. Acting in each individual of either sex simultaneously and with mutual involved interdependencies, they form a whole which, in its several parts and their functions, may be likened to the several parts and functions in one of those machines which we ourselves construct—with this difference, however, that in one life is present and in the other it is not. The fundamental question is whether this complex animal mechanism, thus constituted of certain physical systems, also constitutes during this life the entire individual. If so, the individual existence is a unit, and, when the physical organism perishes by what we call death, the individual existence ceases. If, on the contrary, we have satisfactory proof that there is, during this life, in each individual an organized and extended entity, composed, like the systems of the bodily organisms, of certain systems of its own but of a substance that is not material, then the existence of each individual is a dual existence; and one of the two existences now associated and acting together may be dissolved into its original material elements, while the other, composed of a different substance, may be indissoluble and have an endless life. There is no middle ground that I can perceive between these two hypotheses. One or the other of them is absolutely true, independent of the inquiry as to the mode in which mind came to exist; for after going through with all the reasoning and all the proofs that are supposed to show its origin by the process called evolution, we must still come back to the question of what mind is after it has come into existence; must determine on which side lies the preponderating probability of its continuance after the death of the body; and must accept the conclusion of its destruction or cessation when the body dies, or the other conclusion that it is unlike the body in its substance, and therefore indestructible by the means which destroy the body. For this reason we must

examine the mind for proof that it is an organism of a special nature because composed of a special substance, and this proof is to be reached by an analysis of the systems of which the mind is composed. I select, of course, for the purposes of this analysis, any individual whose physical and mental faculties have had the average development into the condition that is called a sound mind in a sound body—*mens sana in corpore sano*. I shall treat incidentally of the condition of idiocy.

We may classify the distinct systems of the mind, with their several functions, as easily as we can classify the distinct systems of our physical structure and their functions. I have seen the systems of the mind distributed into five; and although I do not adopt the whole analysis made by the writer to whom I refer, or make use of the same terminology, I shall follow his classification because it is one which any thinking person must recognize as a description of mental powers of which he is conscious.* We are all aware that we possess the following mental systems in which inhere certain elementary powers that are mental powers :

1. A sensory system, by which the mind takes impressions from matter.
2. A system of intellectual faculties, such as reason, imagination, reflection, combination of ideas, discrimination between different ideas.
3. A system of emotions, or susceptibilities to pleasure or pain, of a moral and intellectual nature as distinguished from the pleasurable or painful excitation of our nerves.
4. A system of desires, which prompt us to wish for and acquire some good, or to avoid some evil.
5. A system of affections, which prompt us to like or

* I have allowed Sopherus to follow in the main the writer to whom I have already referred in the note on page 471—Mr. Bishop, of Florida.

dislike persons, things, situations, and whatever is attractive or unattractive, as the case may be.

A little further analysis of each of these systems will explain why they are respectively to be thus classified as distinguishable organic powers or functions of the human mind :

First. The mind is placed as a recipient in correspondence with the material universe through the nerves of sensation and the special corporeal organs, whereby the properties of matter become to some extent known to us. As the power of the physical senses to obtain for us a knowledge of the properties of matter is limited, even when our senses are in the utmost state of their normal capacity, there may be properties of matter which will never become known to us in our present existence. But certain of its properties do become known to us, and we are perfectly aware that this takes place through our physical organs of sense, which convey to our mental reception certain impressions. This power of the mind, therefore, to receive such impressions, to retain and transmute them into thought, is to be recognized as a power exerted by means of an organic physical contrivance and an organic mental structure, the two acting together, the resultant being the mind's faculty for receiving ideas from the external world. Let us suppose, then, that the bodily senses are impaired by the partial destruction of their organs. It does not follow that the knowledge which has been derived from them, when they were in full activity, is destroyed ; all that happens is that we acquire no more of such knowledge by the same means, or do not acquire it so readily and completely. If the destruction of the physical senses is so complete as it becomes when death of the whole body takes place, the materials derived from the impressions conveyed to the mind from external objects during life have been transmuted into ideas and thoughts, and, as that which holds the ideas

and the thoughts is of a substance unlike in nature to the substance of the physical organs which conveyed the impressions, the rational conclusion is that the ideas and thoughts will continue to be held by it, after the dissolution of the body, as they were held while the body was in full life.

Second. I recognize in the mind a system of intellectual faculties. Of intellect, I should say that the ascertainment of truth is its primary function; and hence I should say that the power of retaining permanent possession of truth already ascertained is the means by which we maintain continued ascertainment, or the utilization of truth already ascertained.* For the exercise of this power of ascertaining, holding, applying, and expressing truth—the processes of intellect—we have three recognized faculties. These are the intuitive faculty; the faculty of association or combination; and the introspective faculty, or the capacity to look inward upon the processes of our own minds. The philosophers who maintain that all our knowledge is derived from experience admit neither the intuitive faculty nor the fact of intuition. On the other hand, the philosophers who maintain, as Mr. Spencer does, that the brain of every infant is an organized register of the experiences of his ancestors, do not allow of the existence of any intuitions as facts in the individual life of the infant, because they regard the individual experiences of the infant as mere repetitions of former experiences that took place in its progenitors. But rightly regarded the true meaning of the intuitive faculty is this: that at the instant when a new sensory impression is received by the infant, or the adult, there is an innate and implanted power which comes into play, by which is asserted the reality of that from which the sensory impression is received. This power, the

* Bishop.

intuitive faculty, is infallible. It was ordained as the means by which a sensory impression becomes to us a reality. We are so constructed, mentally, that we must believe those primary facts which the sensory impressions certify to us to be facts. On the veracity of this certification we are absolutely dependent, because we can not contradict the affirmations of reality which causation makes to our intuitive mental perceptions. On this veracity we risk our lives ; we could not be safe if we were not subjected to this belief. Intuition, therefore, is something anterior to experience ; it is that power by which the first experience and the last become to us the means of belief in a reality. This is a power that can belong to and inhere in a spiritual organism alone. We must, therefore, recognize in the infant this original implanted endowment, the capacity to be mentally convinced of realities ; and while, in order to the first exercise of this capacity there must be a physical organism which will conduct the sensory impressions to the brain and a brain that will receive them, the capacity of the infant to have its first conviction of the reality certified to it by the sensory impression is at once the capacity of an intellectual being, and a necessity imposed upon him by the law of his existence. Idiocy, when complete, is the absence of this capacity, by reason of some failure of connection between the brain, as the central recipient of sensory impressions, and the mind which should receive and transmute those impressions into thought. We are scarcely warranted in regarding the idiot as a human animal possessed of no mind whatever. The absolute idiot should be defined as a human creature whom we can not educate at all—in whom we can awaken no intelligence ; but we are not therefore authorized in believing that there is no provision whatever for the development of intelligence after the mere physical life of the body is ended. Absolute idiocy, or what, from our as yet imperfect means of devel-

oping intelligence in such unfortunate persons we must regard as at present absolute, is probably very rare. Between human creatures so born and those vast multitudes in whom average intelligence is developed by surrounding influences, whatever they may be, there are various degrees of the capacity for development; and what happens in these intermediate cases proves that there are different degrees in which the connection between the physical and the mental organism is established at birth, so that in some the connection may be said to be abnormal and imperfect, while in the enormous majority it is at least so nearly normal and complete that intelligence may be developed.

Here, then, is the place to advert to Mr. Spencer's assertion that the doctrine that intelligence in the human being is wholly produced by experience is utterly inadmissible; that it makes the presence of a brain meaningless, and idiocy unaccountable. A doctrine which imputes the development of intelligence *wholly* to the experience of the individual is of course untenable. There must be a brain and a nervous system; but we are not warranted, in the case of the idiot, in assuming that he has a differently organized brain and nervous system from those of his parents or others of the human race, as Mr. Spencer appears to me to assume. What we are warranted in believing is that while the brain and nervous system of the idiot child may be just as complete in his structure as in those of the parents, there has somehow occurred, from some cause, antecedent in some cases to birth, but operating after birth in other cases, a failure of the adequate connection between the brain and the mind, so that intelligence can not be developed at all, or can be developed but partially. The individual may have inherited just as good an "organized register" of the experience of his ancestors—just as good a natural brain as his brothers and sisters who are perhaps highly intelligent from their birth, or capable of becoming

intelligent. Yet he lacks the ability to co-ordinate impressions and to perform the actions appropriate to those impressions, because there has failed to be established in him the necessary connection between the impressions and the sensory intellectual system which constitutes one organic part of the mind. The experiences, however often repeated, of the impressions produced by his physical senses on his brain, remain there as corporeal feelings. They reach no further. They do not become transmuted into ideas, and so intelligence can not be developed, or is developed but to a very feeble extent. Instead of saying that "the gradually increasing intelligence displayed throughout childhood is more attributable to the completion of the cerebral organization than to the individual experiences," I should say that it is most attributable to the presence of an established connection between the function of the cerebral organization and the mental receptivity of impressions, which is not merely passive, but is incessantly active because incessantly receiving, and that, where this connection is wanting, the receptivity, although it may exist, can not become active, and so intelligence can not be developed in this life. But there may be another state of existence, in which the mind of the idiot, no longer dependent on a physical organization of brain and nervous system for the reception of ideas and for intellectual growth, but retaining its capacity for mental development, may begin and carry on such development by other means ; whereas, if the brain and the nervous system constitute all there is of any human being, whether born an idiot or born capable of intellectual growth through his individual experiences, he can have no future after that brain and nervous system are destroyed, unless we suppose that mind is something that has been developed out of matter into a spiritual existence—a supposition which is to me inconceivable.

The second of the intellectual faculties is the associa-

tive, or that intuitive power by which ideas are combined and associated or held in disjunction and separation. I regard this as an intuitive faculty, because, as our observation teaches us, its presence and power, manifested at the first dawning of infantile intelligence, are attested by every exercise of the organs through which the external world reaches our minds, to the last moment of our mortal existence. Experience is, of course, necessary to the first action of this intuitive faculty. This is only another way of saying that there must occur a sensory impression upon the brain which becomes transmuted into the idea of the external object, and then a repetition of that impression produces a repetition of the idea, and the associative faculty combines or disjoins them. But unless there exists an intuitive power, inherent in the intellectual system, whereby the first idea and the second can be associated and compared, there can be no knowledge, no acquisition of truth, because the sensory impressions will stop in the brain as so many feelings excited through the nervous system, instead of being transmuted into thought.

The introspective faculty, on the other hand, does not deal solely with sensory impressions, or with the ideas which they have suggested. It is that power of the mind by which it can look inward upon itself. This is seemingly a paradox ; but nevertheless, the existence of such a faculty is a necessary hypothesis, not only because we are conscious of it, but because without it we could have no means of analyzing our own mental structure, although we could make some very partial analysis of the mind of another individual by studying his actions. As regards ourselves, it is as if our visual organs possessed the power of looking at the process by which an image of an external object is impressed upon the retina and is thence transmitted to the brain, where the sensory impression is produced. This, of course, is a physical impossibility. All we can do

is to examine the physical structure of the eye, with its wonderful provision of lenses and other means for the reception and the effect of light, and to reason upon what we can discover that the process of what is called seeing must be thus or thus. But that process itself we can not see by the same organs by which it is carried on. In the case of the mind, however—and herein is one of the remarkable proofs of its unlikeness as an organism to the bodily organism—there is a power to witness, to observe, to be sensible of its own operations. This power, like all the other mental powers, may be very feeble in some individuals, for want of exercise, but in others, from long and frequent exercise, it may become exceedingly vigorous, and be the means of advancing mental philosophy if its observations are preserved and recorded. It is one of the systems which, as a whole, constitute the spiritual organism to which we give the name of mind. Such a capacity can not be predicated of a physical organism. It is impossible for us to conceive of a machine standing and looking upon its own operations, speculating upon their improvement, or thinking of the relation of its mechanism to the human author of its being. It is equally impossible for us to think of the body of man contemplating its own existence, or being sensible of it; but it is perfectly easy to conceive of its being known to the mind that inhabits it, which takes cognizance both of its own operations and of the operations of the physical organism, reflects upon them separately or in their action upon one another, and spontaneously refers both to an author.

Third. I have placed third in the category of mental systems the system of emotions or susceptibilities to mental pleasure or pain, as distinguished from the pleasurable or painful excitation of our nervous system. No one can doubt that, however powerful may be the influence upon our mental states of physical pain or physical sensations

that are pleasurable, there is such a thing as mental pain and mental pleasure, satisfaction or dissatisfaction, wholly unconnected with and in no way dependent upon our corporeal feelings, present or past. It is from this susceptibility to mental pain or pleasure that we come to have the idea of goodness or badness, which is originally a classification of the qualities of external things as good or bad ; the good being those which affect us pleurably, and the bad those which affect us painfully. By our mental organization we are placed in such correspondence with the material universe, that things apart from ourselves affect us agreeably or disagreeably ; sights, sounds, odors, and tastes give us pleasure or pain. We are also placed in correspondence with the spiritual universe, and thereby certain acts, relations, and traits of character give us pleasure, or the reverse. In process of time, the youth whose mental systems are in the course of expansion comes to perceive that his own acts give him pleasure or pain, and hence he derives the perception of good or bad qualities in himself. Moral goodness in ourselves—goodness of disposition, of intention, of volition, of habit—is found to be distinct from physical and intellectual goodness ; and thus the consciousness of moral goodness becomes the intellectual faculty to which moral commands can be addressed, with a prospect that the connection between obedience and happiness will be perceived. This susceptibility to mental pain or pleasure, from the qualities of external things, from the acts and dispositions of other persons, and from our own, is one that can inhere in a mental organization, but it can not possibly inhere in a physical organism. The physical organism is undoubtedly the means by which the mental susceptibility to pleasure or pain is reached from the external universe ; but, unless there is a mental organism to feel the pleasure or the pain, the action of the physical organization is nothing but the excitation of the nervous system. I, therefore,

make a distinct class among the mental systems, and assign to it the faculty of experiencing mental pleasure or mental pain as a capacity distinct from the pleasurable or painful excitation of our nerves.

Fourth. In the category of mental systems may be placed those desires which lead us to wish for and strive to obtain some good or to avoid some evil. This, surely, is not to be regarded as anything but an intellectual perception of what is to us a good or an evil. It is a structural capacity of the soul which, after an experience of that which we learn to be good for us, or the reverse of good, is always prompting us to take the steps or to perform the acts which will insure a repetition of that experience, in the acquisition of further good or the avoidance of further evil. Its operations may be perverted. We may, from bad habits or erroneous ideas of good and evil, pursue objects that are pernicious. But whether we strive for that which is truly good, or is deceptively regarded as a good, we are perpetually acting under the impulse of a desire that is implanted in us, and that operates as a desire whether its objects are worthy or unworthy, beneficial or injurious, noxious or innoxious to our moral health.

Fifth, and lastly, we may classify the affections as one of the structural systems of our spiritual existence. It is that part of our natures that makes us like or dislike both persons and things; and, in regard to the former, it is the capacity for love in its high distinction from the physical appetite of sexual passion. The range of its operation is most various and multiform, but throughout all of its operations it is a spiritual capacity, implanted in us for our happiness as spiritual beings.

If it is objected that this is an arbitrary classification—that as an analysis of structural systems in our mental organization it bears no analogy to the anatomical exploration and classification of the structural systems of our phys-

ical organism—the answer is, that in regard to the latter we make the examination by the exercise of our corporeal senses, chiefly by the visual organs, as we do in the case of all other organized matter. In analyzing the structural organization of our minds, we are examining a subject that is not laid bare to the inspection of any of our corporeal organs; the scalpel in the hand of the dissector can afford us no aid in this investigation, but the inspection must be carried on by turning the eye of the mind inward upon itself. This we are mentally constituted to do. While, therefore, it may be true that the classification which I have made, or which may have been made by others, of the structural mental systems, is in one sense arbitrary, and while in any method of describing them they may run into or overlap one another in a complex organism, it will always remain true that the mind is capable of such examinations, and that the analysis, however given, is useful to the comprehension of the mind as an organized and extended entity. No one can carry on this mental examination without perceiving that he is examining a something which has an independent existence and a life of its own, whether he supposes it to have been evolved out of organized matter, or embraces the idea of its distinct and special creation by an exercise of the Divine Will.

The two main hypotheses concerning the origin of mind may now be contrasted. In the long process of development of animal organisms out of one another there come to be, it is said, higher and higher degrees of intelligence, as the nervous system becomes more and more capable of complex impressions, until we arrive at the consummate physical organization and the supreme intelligence of the human race. The physical organization is open to our examination, and we find the human brain divided into cerebral masses, with ganglia of sensory nerves extending to the external sensory organs. Intelligence is the faculty of

comprehending by previous preparation the combinations of impressions made on the brain through the sensory nerves. The brain being an organized register in which the experiences of progenitors have accumulated a high degree of this faculty, each human infant born into the world comes into it with a prepared capacity to acquire the combinations of impressions produced in his individual experience. Transmitted from generation to generation, this inherited capacity becomes the means by which each individual manifests and enjoys what we call intelligence ; and the resulting aggregate of all the faculties thus called into exercise is what we denominate mind. It must be observed, however, that this theory or explanation of the origin of mind, rejecting the hypothesis of its special creation as a being of a spiritual nature, assumes it to be a something which has been developed out of the growth and improvement of a physical organism. When you inquire whether the nature of this something is supposed to be a product of a different substance from matter, although developed out of matter, you are left without an answer ; and when you press the inquiry whether a spiritual existence can be conceived as having grown out of the action of a physical organism, you are told that there are no means of determining what a spiritual existence is, because there is nothing with which you can compare it so as to ascertain what it resembles or what it does not resemble. Or if there are some who accept the evolution theory of the origin of mind, and who think it possible that a spiritual existence can owe its origin to the action of matter without any intervention of a creating power purposely giving existence to a spiritual essence, you have to ask a question to which you can only get this answer : that it has pleased the Almighty Being to establish a system by which a spiritual in contradistinction to a physical existence has been developed in countless ages out of the action of material substances or-

ganized into definite systems and endowed with the principle of life. Those who assume this hypothesis must necessarily assume also that the spiritual existence is, after it has come into being, an existence distinct from the physical organism, although generated out of it, and then they must encounter the further inquiry as to the probability of the supposed method of production resorted to by the Supreme Being.

More than once in the course of our colloquies I have had occasion to say that, in all our inquiries of this nature, whether in regard to the origin of our physical organism or that of our mental existence, we must constantly bear in mind the unbounded capacity of the Creator to adopt any method of production whatever ; that it is just as much within his power to call things of the most opposite natures into existence by a single word as it is to establish methods by which they shall be developed through innumerable ages of what we call time. That the Being who is supposed to preside over the universe and to hold this unlimited power is an hypothesis I readily admit ; but I affirm that his existence and attributes are necessary postulates, without which there can be no reasoning concerning the origin of anything. Whether that Being exists and possesses the attributes which we impute to him I have all along said is a matter of which we must be satisfied by independent proofs before we undertake to investigate his probable methods.

The hypothesis of the origin of mind which I now mean to contrast with that of the evolutionists may be stated as follows : It is a rational deduction, from all that we know of our physical organism, that procreation of new individuals of that organism by the sexual union of male and female was established as the means of continuing the species of animal known as man. When or how established is not a material part of the inquiry that I now make. It may have been that the division of the sexes came about by a

very slow process, or it may have been by the aboriginal creation of a completed pair, male and female. However or whenever it came to exist, there came to be one uniform method of bringing into existence new individuals of a peculiar and perfectly distinguishable animal type. If we confine our attention to the physical organism of man, it is perfectly apparent that when procreation and gestation take place they happen because of the established law that a new individual of this species of animal shall be produced by the sexual union of two other individuals, male and female, and that the new individual shall have the same physical organism as the parents. A new physical life thus springs out of two other physical lives by a process the secret of which we can not detect, although we can trace it through some of its stages so far as to see that there is a secret process by which two physical organisms give existence to another physical organism of the same type and having the same principle of life.

As the new individual animal grows into further development, we find that along with his animal organism and united with it by a tie which we can not see, but about which we can reason, there is apparently present a kind of life that is something more than the life of the body. The further we carry our investigations of the phenomena which indicate the existence of this mental life, the more we become convinced that it is the life of a spiritual organism. As the Creator had the power to give existence to the corporeal organism, why had he not an equal power to give existence to a spiritual organism? If he established the law of sexual union between a male and a female in order to perpetuate the type of animal to which they belong—the law which gives existence to a new individual of that animal type every time that a new conception and a new birth take place—why should he not have established the collateral law that every time there is a new birth of an infant there

shall come into existence a spiritual entity which shall be united to the corporeal organism for a time, thus constituting in that infant a dual existence which makes his whole individuality during this life? If we suppose that the physical organism of our double natures was left to be worked out by a very slow process, by which physical organisms are developed out of one another—or by which we theoretically suppose them to have been so developed—why is it necessary to suppose that our spirits or souls have been developed in the same way or by an analogous method? What reason have we to believe that the Creator works by the same methods in the spiritual world, or by methods that are of the same nature as those which we think we can discover to be his methods in giving existence to corporeal organisms? The two realms of spirit and matter are so completely unlike that we are not compelled to believe that the methods by which creation of organisms of the two kinds are effected by the Almighty are necessarily or probably the same.

In order to be clearly understood I will now repeat my hypothesis in a distinct form. I assume the existence of a pair of animals of the human type, male and female, endowed with the power of producing new individuals of the same type. In their physical organisms is established the law of procreation, and in the female counterpart of that organism is established the concomitant law of conception and parturition. Thus far provision is made for the production of a new individual physically organized like the parents. In those parents there is also established another law, by the operation of which the same process which results in the production of the new individual animal organism brings into existence a spiritual organism, which is united with and becomes the companion of the physical organism so long as the latter shall continue to live. These laws established in the first pair and in every succeeding pair continue to op-

erate through every succeeding generation. Perhaps it will be said that this attributes the production of a spiritual organism to a physical process ; but, in truth, it does no more than to assert the simultaneous production of the two existences. It is not necessary to assume that the foetus which becomes at birth the human infant is before birth animated by a soul ; for it is not necessary to suppose, nor is it apparently true, that the physical organism is complete until birth takes place and the breath of life enters the lungs, thus constituting a new life other than that of the foetus or the unborn child, although the one is a continuation of the other. At whatever point of time the complete animal organism is in a condition to be observed so that we can say here is a living child, at that point we begin to perceive a capacity to receive impressions from the external world without the connection that has theretofore existed between the unborn child and the maternal system. This capacity must either be attributed to the individual experience of the infant, so that without experience of his own he can not begin to be possessed of a growing intelligence, or it must be imputed to an innate and implanted power resident in a spiritual organism that comes into exercise whenever the physical organism has begun to draw the breath of life.

The evolution hypothesis of the origin of the human mind necessarily leaves its nature in an indeterminate state that will not satisfy the requirements of sound reasoning. In one mode of stating and reasoning upon this hypothesis it is assumed that there is not now and never was a mental existence that was created in each individual of the race at his birth ; but that at some very remote period in the history of successive animal organisms there was produced an animal of a highly developed nervous structure, capable of intelligence by reason of a superior power of receiving physical impressions and co-ordinating them into states of con-

sciousness which correspond to the physical feelings ; and to the perpetually recurring series of these states of consciousness we give the name of mind. This capacity of intelligence is transmitted from parents to offspring, the experiences of the former being registered in the brain of the latter ; but however complete may be the inherited nervous structure, and however great the capacity for intelligence, mind in each individual of the race is evidenced by nothing but a constant succession and variation of certain states of feelings produced in the nervous structure.

Against this view we may place what we know from constant observation. We know that it has been ordained, as a consequence of the sexual union of two individuals of opposite sex, there shall come into existence a new individual of the same physical organism as the parents. Of the interior process by which this product is effected we must remain ignorant, but about the fact there can be no doubt. That fact is, that by the union of certain vesicles contributed by each of the parents there results a new individual organism. We know further that simultaneously with the complete production of the new physical organism, there comes into being, and is incorporated with it, an existence that we are compelled by the phenomena which it manifests to regard as a non-physical and a spiritual organism. Of the process by which this distinct existence is effected, we must remain as ignorant as we are of the process by which the physical organism was made to result from the sexual union of the parents. But of the fact there can be no more doubt in the one case than in the other. In every instance of a new birth of a perfect infant, we know that there results a dual existence in the same individual ; the one manifested by physical, the other by mental phenomena. To argue that the mental and spiritual existence grew out of an improved and improving physical organism in long-past ages, and became an adjunct

to that organism after it had attained a certain development, without any intervention of the creating power at each new birth of an individual infant, is to limit the power of the Creator in a realm wherein the subject of his creating power is essentially unlike the subject with which he deals when he deals with physical organisms. In all reasoning upon the origin and nature of the human mind, the boundless power of the Creator must be assumed. In judging of the probabilities of his methods of action, it is the safest course to be guided by what we can see takes place at every new birth of a human infant. The physical organism results from the operation of a certain law. The mental organism results, it is alike rational to presume, from the operation of a certain other law. How either of these laws operates we are not permitted to know, but we can as safely infer the one as the other, from what is open to our observation.

I shall now touch briefly upon another argument, the foundation of which is to be tested by historical facts into the truth of which I shall not here inquire, because they must, for the purposes for which I use them, be assumed. The immortality of the human soul is said to have been proved by a Divine revelation. This great fact is supposed to be established by evidence of a character quite different from that which convinces us of the existence and attributes of the Almighty. But, assuming revelation to be a fact, it has an important bearing upon the subject of this essay, because the question arises, for what conceivable reason the Almighty should have made to us a revelation of our immortality, through the direct testimony of a competent witness, if we are not spiritual beings. Information of a fact supposes that there was a person to be informed. Concurrently with the consciousness which assures us of our personality, we have the assurance of our immortality certified to us by a messenger expressly authorized to give us

the information. If the mind, or that part of our individuality which we call the soul, is in its origin and nature nothing but what the evolution theory supposes, what was there to be informed of immortality, or of anything else? The possibility and certainty of an existence after the death of the body is a conviction that must exercise great influence over the conduct of men in this life. It is consistent with the whole apparent scheme of the revelation to suppose that it was made for a twofold purpose : first, to cause men to lead better lives in this world than they might have led without this information and conviction ; and, secondly, to form them for greater happiness in another world. The first of these purposes might have been effectuated by causing men to believe in their own immortality, notwithstanding the belief might be a delusion because there is no being capable, in fact, of any existence after the life of the body is ended. But such a method of action is hardly to be imputed to the Creator and Supreme Governor of the universe, according to the ideas of his character which natural religion alone will give us. It is not in accordance with rational conceptions of his attributes to suppose that he deludes his rational creatures with assurances or apparent proofs of something that is not true for the sake of making them act as if it were true. When we find ourselves running into a hypothesis of this kind, we may be pretty sure that we are departing from correct principles of reasoning. In regard to the second of the supposed purposes for which the revelation of immortality was made—to form men for greater happiness in another state of existence—it is quite obvious that the supposed scheme of the revelation is a mere delusion, if we are not beings capable of a continued spiritual existence after the death of our bodies. It is therefore a matter of great consequence to determine what the evolution theory of the origin and nature of the human mind makes us out to be.

I have never seen any statement of that theory that does not lead to the conclusion that man is a highly developed animal organism, whose mental existence is not something created in each individual of the race, and of a substance and organized structure different from the physical organism, but whose mental phenomena are merely exhibitions and effects of occurrences taking place in the physical system, and assuming the shape of what for distinctness is called thought. In whatever form this theory has been stated by its most distinguished professors, it leaves only an interval of degree, and not an interval of kind, between the mind of man and that which, in some of the other animals, is supposed to be mind. The evolution doctrine, taken in one of its aspects, supposes one grand chain of animal organisms, rising higher and higher in the scale of animal life, but connected together by ordinary generation, so that they are of one kindred throughout; but that, as each distinct species grows out of predecessors, by gradual improvements and increments, forming more and more elaborate organisms, man is the consummate product of the whole process. But when we ask at what point or stage in the series of developing animal organisms the mind of man was produced, or what it was when produced, we get no satisfactory answer. To the first question, it can only be answered, as Darwin himself answers, that there must be a definition of man before we can determine at what time he came to exist. To the second question, we have answers which differ materially from each other. First, we have whatever we can extract from such a system of psychology as Mr. Spencer's, which ignores the capability of the mind to exist independent of the nervous structure and the brain, because it excludes the idea of any ego, any me, any person, and makes consciousness to consist of a connected series of physical feelings, to which there are corresponding psychical equivalents that he calls

mental states. It would seem to follow, therefore, that when there is no longer remaining for the individual any nervous structure and any brain, the mental states, or psychological side of the physical impressions, must cease ; or, in other words, that the only existing ego has come to an end.

On the other hand, I have seen an ingenious hypothesis which it is well to refer to, because it illustrates the efforts that are often made to reconcile the doctrines of evolution with a belief in immortality. This hypothesis by no means ignores the possibility of a spiritual existence, or the spiritual as distinguished from the material world. But it assumes that man was produced under the operation of physical laws ; and that after he had become a completed product—the consummate and finished end of the whole process of evolution—he passed under the dominion and operation of other and different laws, and is saved from annihilation by the intervention of a change from the physical to the spiritual laws of his Creator. Put into a condensed form, this theory has been thus stated : Having spent countless æons in forming man, by the slow process of animal evolution, God will not suffer him to fall back into elemental flames, and be consumed by the further operation of physical laws, but will transfer him into the dominion of the spiritual laws that are held in reserve for his salvation.

One of the first questions to be asked, in reference to this hypothesis, is, Who or what is it that God is supposed to have spent countless æons in creating by the slow process of animal evolution ? If we contemplate a single specimen of the human race, we find a bodily organism, endowed with life like that of other animals, and acted upon by physical laws throughout the whole period of its existence. We also find present in the same individual a mental existence, which is certified to us by evidence entirely different from that by which we obtain a knowledge of the physical

organism. As the methods employed by the Creator in the production of the physical organism, whatever we may suppose them to have been, were physical laws operating upon matter, so the methods employed by him in the production of a spiritual existence must have operated in a domain that was wholly aside from the physical world. Each of these distinct realms is equally under the government of an Omnipotent Being ; and while we may suppose that in the one he employed a very slow process, such as the evolution of animal organisms out of one another is imagined to have been, there is no conceivable reason why he should not, in the other and very different realm, have resorted to the direct creation of a spiritual existence, which can not, in the nature of things, have required to be produced by the action of physical laws. When, at the birth of each individual of the human race, the two existences become united, when, in consequence of the operation of that sexual union of the parents which has been ordained for the production of a new individual, the physical and the spiritual existence become incorporated in the one being, the fact that they remain for a certain time mutually dependent and mutually useful, co-operating in the purposes of their temporary connection, does not change their essential nature. The one may be destructible because the operation of physical laws may dissolve the ligaments that hold it together ; the other may be indestructible, because the operation of spiritual laws will hold together the spiritual organism that is in its nature independent of the laws of matter.

I can therefore see no necessary connection between the methods employed by the Almighty in the production of an animal and the methods employed by him in the production of a soul. That in the birth of the individual the two come into existence simultaneously, and are temporarily united in one and the same being, only proves that the

two existences are contemporaneous in their joint inception. It does not prove that they are of the same nature, or the same substance, or that the physical organism is the only ego, or that the psychical existence is nothing but certain states of the material structure, to whose aggregate manifestations certain philosophers give the name of mind, while denying to them personal individuality and the consciousness of a distinct being.

And now, in bringing this discussion to a close, I will only add that the great want of this age is the prosecution of inquiry into the nature of the human mind as an organic structure, regarded as such. It seems to me that the whole mission of Science is now perverted by a wrong aim, which is to find out the external to the neglect of the internal—to make all exploration terminate in the laws of the physical universe, and go aside from the examination of the spiritual world. It is no reproach to those who essay the latter inquiry that they are scoffed at as “the metaphysicians.” It matters not what they are called, so long as they pursue the right path. It is now in regard to the pursuit of science as it was formerly in regard to the writing of history. That philosophical French historian, M. Taine, has luminously marked the change which has come over the methods and objects of historical studies in the following passage :

“When you consider with your eyes the visible man, what do you look for ? The man invisible. The words which salute your ears, the gestures, the motions of his head, the clothes he wears, visible acts and deeds of every kind, are expressions merely ; somewhat is revealed beneath them, and that is a soul—an inner man is concealed beneath the outer man ; the second does not reveal the first ; . . . all the externals are but avenues converging toward a center ; you enter them simply to reach that center, and that center is the genuine man—I mean that mass of faculties and feelings which are the inner man. We have reached a new

world, which is infinite, because every action which we see involves an infinite association of reasonings, emotions, sensations new and old, which have served to bring it to light, and which, like great rocks deep-seated in the ground, find in it their end and their level. This under-world is a new subject-matter proper to the historian. . . . This precise and proved interpretation of past sensations has given to history, in our days, a second birth; hardly anything of the sort was known to the preceding century. They thought men of every race and country were all but identical—the Greek, the barbarian, the Hindoo, the man of the Renaissance, and the man of the eighteenth century—as if they had all been turned out of a common mold, and all in conformity to a certain abstract conception which served for the whole human race. They knew man, but not men; they had not penetrated to the soul; they had not seen the infinite diversity and complexity of souls; they did not know that the moral constitution of a people or an age is as particular and distinct as the physical structure of a family of plants or an order of animals.” *

In the same way psychology needs a new birth, like the new birth of history. If we would know the mind, we must reach the conviction that there is a mind: and this conviction can be reached only by penetrating through all the externals, through the physical organism, through the diversities of race, through the environment of matter, until we have found the soul. If history, like zoölogy, has found its anatomy, mental science must, in like manner, be prosecuted as an anatomical study. So long as we allow the anatomy of zoölogy to be the predominant and only explanation, the beginning and the end of the mental manifestations, so long we shall fail to comprehend the nature of man, and to see the reason for his immortality.

* Introduction to Taine's "History of English Literature," translated by H. Van Laun. New York: Henry Holt & Co., 1885.

GLOSSARY

OF

SCIENTIFIC AND TECHNICAL TERMS USED IN THIS WORK.

[THE following definitions marked with an asterisk are borrowed from the glossary annexed to Darwin's "Origin of Species." The remainder of the definitions are taken from Webster's Dictionary.]

***Aberrant.** Forms or groups of animals or plants which deviate in important characters from their nearest allies, so as not to be easily included in the same group with them, are said to be aberrant.

***Abnormal.** Contrary to the general rule.

***Aborted.** An organ is said to be aborted when its development has been arrested at a very early stage.

Äerate (Zoöl.). To subject to the influence of the air by the natural organs of respiration; to arterialize; especially used of animals not having lungs.

Agnostic (*a.*). Professing ignorance; involving no dogmatic assertion; leaving a question or problem still in doubt; pertaining to or involving agnosticism.

Agnostic (*n.*). One who professes ignorance, or refrains from dogmatic assertion; one who supports agnosticism, neither affirming nor denying the existence of a personal Deity.

Agnosticism. That doctrine which, professing ignorance, neither asserts nor denies; specifically, in theology, the doctrine that the existence of a personal Deity can be neither asserted nor denied, neither proved nor disproved, because of the necessary limits of the human mind (as sometimes charged upon *Hamilton* and *Mansel*), or because of the insufficiency of the evidence furnished by psychical and physical data, to warrant a positive conclusion (as taught by the school of *Herbert Spencer*); opposed alike to dogmatic skepticism and to dogmatic theism.

Allantois, Allantoid. A thin membrane, situated between the chorion and amnion, and forming one of the membranes which invest the foetus.

***Analogy.** That resemblance of structures which depends upon similarity of function, as in the wings of insects and birds. Such structures are said to be *analogous*, and to be *analogues* of each other.

Anthropomorphism. The representation of the Deity under a human form, or with human attributes.

***Articulata.** A great division of the animal kingdom, characterized generally by having the surface of the body divided into rings, called segments, a greater or less number of which are furnished with jointed legs (such as insects, crustaceans, and centipeds).

Articulation (Anat.). The joining or juncture of the bones of a skeleton.

Ascidians. A class of acephalous mollusks, having often a leathery exterior.

Biology. The science of life; that part of physiology which treats of life in general, or of the different forces of life.

Brain. The upper part of the head. 1. (Anat.) The whitish, soft mass which constitutes the anterior or cephalic extremity of the nervous system in man and other vertebrates, occupying the upper cavity of the skull; and (b) the anterior or cephalic ganglion in insects and other invertebrates.

2. The organ or seat of intellect; hence, the understanding.

3. The affections; fancy; imagination.

***Branchiæ.** Gills, or organs for respiration in water.

***Branchial.** Pertaining to gills or branchiæ.

***Canidæ.** The dog family, including the dog, wolf, fox, jackal, etc.

Cell. A minute, inclosed space or sac, filled with fluid, making up the cellular tissue of plants, and of many parts of animals, and originating the parts by their growth and reproduction; the constituent element of all plants and animals (though not universal for all parts of such structure), much as a crystalline molecule is the element of a crystal. In the simplest plants and animals (as the *infusoria*), one single cell constitutes the complete individual, such species being called *unicellular* plants or animals.

Cephalopod (Fr. *céphalopode*, from Gr., head and foot). (Zool.) An animal of the sub-kingdom *Mollusca*, characterized by a distinct head, surrounded by a circle of long arms or tentacles, which they use for crawling and for seizing objects. See MOLLUSK.

***Cetacea.** An order of Mammalia, including the whales, dolphins, etc., having the form of the body fish-like, the skin naked, and only the fore-limbs developed.

Chaos. 1. An empty, infinite space; a yawning chasm.

2. The rude, confused state, or unorganized condition, of matter before the creation of the universe.

Consciousness. 1. The knowledge of sensations and mental operations, or of what passes in one's own mind; the act of the mind which makes known an internal object.

2. Immediate knowledge of any object whatever.

***Crustaceans.** A class of articulated animals having the skin of the body generally more or less hardened by the deposition of calcareous matter, breathing by means of gills. (*Examples*, crab, lobster, shrimp, etc.)

Dynamically. In accordance with the principles of dynamics or moving forces.

***Embryo.** The young animal undergoing development within the egg or womb.

***Embryology.** The study of the development of the embryo.

Ethics. The science of human duty; the body of rules of duty drawn from this science; a particular system of principles and rules concerning duty, whether true or false; rules of practice in respect to a single class of human actions; as political or social ethics.

***Fauna.** The totality of the animals naturally inhabiting a certain country or region, or which have lived during a given geological period.

Fetichism, Feticism. One of the lowest and grossest forms of superstition, consisting in the worship of some material object, as a stone, a tree, or an animal, often casually selected; practiced among tribes of lowest mental endowment, as certain races of negroes.

***Flora.** The totality of the plants growing naturally in a country or during a given geological period.

***Fœtal.** Of or belonging to the fœtus, or embryo in course of development.

Fœtus, same as Fetus. The young of viviparous animals in the womb, and of oviparous animals in the egg, after it is perfectly formed, before which time it is called *embryo*.

***Ganoid Fishes.** Fishes covered with peculiar enameled bony scales. Most of them are extinct.

Genus (Science). An assemblage of species possessing certain characters in common, by which they are distinguished from all others. It is subordinate to *tribe* and *sub-tribe*; hence, a single species having distinctive characters that seem of more than specific value may constitute a genus.

***Germinal Vesicle.** A minute vesicle in the eggs of animals, from which the development of the embryo proceeds.

Gravitation (Physics). That species of attraction or force by which all bodies or particles of matter in the universe tend toward each other; called also *attraction of gravitation*, *universal gravitation*, and *universal gravity*.

Grāvity (Physics). The tendency of a mass of matter toward a center of attraction; especially the tendency of a body toward the center of the earth, terrestrial gravitation.

Gyrus, pl. **Gyri** (Anat.). A convolution of the brain.

***Habitat.** The locality in which a plant or animal naturally lives.

Heredity. The transmission of the physical and psychical qualities of parents to their offspring; the biological law by which living beings tend to repeat themselves in their descendants.

Homologous. Having the same relative proportion, position, value, or structure; especially—(a) (Geom.) Corresponding in relative position and proportion. (b) (Alg.) Having the same relative proportion or value, as the two antecedents or the two consequents of a proportion. (c) (Chem.) Being of the same chemical type or series; differing by a multiple or arithmetical ratio in certain constituents, while the physical qualities are wholly analogous, with small relative differences, as if corresponding to a series of parallels; as, the species in the group of alcohols are said to be *homologous*. (d) (Zoöl.) Being of the same typical structure; having like relations to a fundamental type of structure; as, those bones in the hand of man and the fore-foot of a horse are *homologous* that correspond in their structural relations—that is, in their relations to the type-structure of the fore-limb in vertebrates.

Homology. That relation between parts which results from their development from corresponding embryonic parts, either in different animals, as in the case of the arm of a man, the fore-leg of a quadruped, and the wing of a bird; or in the same individual, as in the case of the fore and hind legs in quadrupeds, and the segments or rings and their appendages of which the body of a worm, a centiped, etc., is composed. The latter is called *serial homology*. The parts which stand in such a relation to each other are said to

be *homologous*, and one such part or organ is called the *homologue* of the other. In different plants the parts of the flower are homologous, and in general these parts are regarded as homologous with leaves.

Hypothesis. 1. A supposition; a proposition or principle which is supposed or taken for granted, in order to draw a conclusion or inference for proof of the point in question; something not proved, but assumed for the purpose of argument.

2. A system or theory imagined or assumed to account for known facts or phenomena.

Imago. The perfect (generally winged) reproductive state of an insect.

Implacenta (*n.*). A mammal having no placenta. (*a.*) Without a placenta, as certain marsupial animals.

Insectivorous. Feeding on insects.

Instinct (*n.*). Inward impulse; unconscious, involuntary, or unreasoning prompting to action; a disposition to any mode of action, whether bodily or spiritual, without a distinct apprehension of the end or object which Nature has designed should be accomplished thereby; specifically, the natural, unreasoning impulse in an animal, by which it is guided to the performance of any action, without thought of improvement in the method.

Invertebrata, or Invertebrate Animals. Those animals which do not possess a backbone or spinal column.

Isomeric (from Gr., equal and part). (Chem.) Having the quality of isomerism; as *isomeric* compounds.

Isomerism (Chem.). An identity of elements and of atomic proportions with a difference in the amount combined in the compound molecule, and of its essential qualities; as in the case of the physically unlike compounds of carbon and hydrogen, consisting one of one part of each, another of two parts of each, and a third of four of each.

Kangaroo. A ruminating marsupial animal of the genus *Macropus*, found in Australia and the neighboring islands.

Larva (plural **Larvæ**). The first condition of an insect at its issuing from the egg, when it is usually in the form of a grub, caterpillar, or maggot.

Lemuridæ. A group of four-handed animals, distinct from the monkeys, and approaching the insectivorous quadrupeds in some of their characters and habits. Its members have the nostrils curved or twisted, and a claw instead of a nail upon the first finger of the hind hands.

Lepidosiren. An eel-shaped animal covered with rounded scales, having four rod-like members, and breathing water like a fish. It is found in ponds and rivers of intertropical Africa and South America. By some it is regarded as a fish, and by others as a batrachian.

Mammal. Belonging to the breast; from *mamma*, the breast or pap. An animal of the highest class of vertebrates, characterized by the female suckling its young.

Mammalia. The highest class of animals, including the ordinary hairy quadrupeds, the whales, and man, and characterized by the production of living young, which are nourished after birth by milk from the teats (*mammæ*, *mammary glands*) of the mother. A striking difference in embryonic development has led to the division of this class into two great groups: in one of these, when the embryo has attained a certain stage, a vascular connection, called the *placenta*, is formed between the embryo and the mother; in the other this is wanting, and the young are produced in a very incomplete state. The former, including the greater part of the class, are called *placental mammals*; the latter, or *aplacental mammals*, include the marsupials and monotremes (*ornithorhynchus*).

Marsupials. An order of Mammalia in which the young are born in a very incomplete state of development, and carried by the mother, while sucking, in a ventral pouch (*marsupium*), such as the kangaroos, opossums, etc. (see MAMMALIA).

Molecule. A mass; one of the invisible particles supposed to constitute matter of any kind.

Mollusk. An invertebrate animal, having a soft, fleshy body (whence the name), which is inarticulate, and not radiate internally.

Monkey. See SIMIA.

Monogamy. A marriage to one wife only, or the state of such as are restricted to a single wife, or may not marry again after the death of a first wife.

Monotheism. The doctrine or belief that there is but one God.

Morphology. The law of form or structure independent of function.

Nascent. Commencing development.

Nexus. Connection; tie.

Nictitating Membrane. A semi-transparent membrane, which can be drawn across the eye in birds and reptiles, either to moderate the effects of a strong light or to sweep particles of dust, etc., from the surface of the eye.

Noumenon (Metaph.). The of itself unknown and unknowable-rational object, or *thing in itself*, which is distinguished from the *phenomenon* in which it occurs to apprehension, and by which it is interpreted and understood; so used in the philosophy of Kant and his followers.

Opossum. An animal of several species of marsupial quadrupeds of the genus *Didelphys*. The common species of the United States is the *D. Virginiana*. Another species, common in Texas and California, is *D. Californica*, and other species are found in South America.

Organism. An organized being, whether plant or animal.

Ovule. An egg. (Bot.) The rudimentary state of a seed. It consists essentially of a nucleus developed directly from the placenta.

Parasite. An animal or plant living upon or in, and at the expense of, another organism.

Pelvis. The bony arch to which the hind-limbs of vertebrate animals are articulated.

Placentalia, Placentata, or Placental Mammals. See MAMMALIA.

Protozoa. The lowest great division of the Animal Kingdom. These animals are composed of a gelatinous material, and show scarcely any trace of distinct organs. The infusoria, foraminifera, and sponges, with some other forms, belong to this division.

Phenomenon. 1. An appearance; anything visible; whatever is presented to the eye; whatever, in matter or spirit, is apparent to, or is apprehended by, observation, as distinguished from its ground, substance, or unknown constitution; as *phenomena* of heat or electricity; phenomena of imagination or memory.

2. Sometimes a remarkable or unusual appearance whose cause is not immediately obvious.

Plexus. Any net-work of vessels, nerves, or fibers.

Polygamy. A plurality of wives or husbands at the same time, or the having of such plurality; usually the condition of a man having more than one wife.

Polytheism. The doctrine of a plurality of gods or invisible beings superior to man, and having an agency in the government of the world.

Proteine (n. Lat., *proteinum*, from Gr., *first*—to be the first—the first place, chief rank, because it occupies the first place in relation to the albuminous principles). (Chem.) A substance claimed by Mulder to be obtained as a distinct substance from albumen,

fibrine, or caseine, and considered by him to be the basis of animal tissue and of some substances of vegetable origin.

The theory of proteine can not be maintained.—*Gregory*.

The theory of Mulder is doubted and denied by many chemists, and also the existence of *proteine* as a distinct substance.

Psychology. A discourse or treatise on the human soul; the science of the human soul; specifically, the systematic or scientific knowledge of the powers and functions of the human soul, so far as they are known by consciousness.

Quadrumane. An animal having four feet that correspond to the hands of a man, as a monkey.

Race. 1. The descendants of a common ancestor; a family, tribe, people, or nation, believed or presumed to belong to the same stock; a lineage; a breed.

2. A root.

Retina. The delicate inner coat of the eye, formed by nervous filaments spreading from the optic nerve, and serving for the perception of the impressions produced by light.

Rotifer (*n.* Lat. *rotifer*, from Lat. *rota*, a wheel, and *ferro*, to bear. Fr. *rotifère*). (Zoöl.) One of a group of microscopic crustaceans, having no limbs, and moving by means of rows of cilia about the head or the anterior extremity.

Rudiment (Nat. Hist.). An imperfect organ, or one which is never fully formed.

Sacral. Belonging to the sacrum, or the bone composed usually of two or more united vertebræ to which the sides of the pelvis in vertebrate animals are attached.

Sacrum. The bone which forms the posterior part of the pelvis. It is triangular in form.

Secularize. To convert from spiritual to secular or common use; as to secularize a church, or church property.

Segments. The transverse rings of which the body of an articulate animal or annelid is composed.

Simia (plural **Simiadæ**) (Lat., an ape, from *simus*, flat-nosed, snub-nosed). (Zoöl.) A Linnæan genus of animals, including the ape, monkey, and the like; a general name of the various tribes of monkeys.

Species (Nat. Hist.). A permanent class of existing things or beings, associated according to attributes or properties which are determined by scientific observation.

Spinal Cord. The central portion of the nervous system in the ver-

tebrata, which descends from the brain through the arches of the vertebræ, and gives off nearly all the nerves to the various organs of the body.

Statical. To stand. 1. Pertaining to bodies at rest, or in equilibrium.

2. Resting; acting by mere weight without motion; as *statical* pressure.

Sulcus. A fissure of the brain, separating two convolutions, or *gyri*.

Teleology (Fr., *téléologie*, from Gr., the end or issue, and discourse).

The science or doctrine of the final causes of things; the philosophical consideration of final causes in general.

Variety (Nat. Hist., Bot., and Zoöl.). Any form or condition of structure under a species which differs in its characteristics from those typical to the species, as in color, shape, size, and the like, and which is capable either of perpetuating itself for a period, or of being perpetuated by artificial means; also, any of the various forms under a species meeting the conditions mentioned. A form characterized by an abnormality of structure, or any difference from the type that is not capable of being perpetuated through two or more generations, is not called a variety.

Vascular. Containing blood-vessels.

Vertebrata; or Vertebrate Animals. The highest division of the animal kingdom, so called from the presence in most cases of a back-bone composed of numerous joints or *vertebræ*, which constitutes the center of the skeleton, and at the same time supports and protects the central parts of the nervous system.

Vesicle. A bladder-like vessel; a membranous cavity; a cyst; a cell; especially (*a*) (Bot.) a small bladder-like body in the substance of a vegetable, or upon the surface of a leaf.—*Gray*. (*b*) (Med.) A small orbicular elevation of the cuticle containing lymph, and succeeded by a scurf or laminated scab; also, any small cavity or sac in the human body; as the umbilical vesicle.

Vortices (*verto*, to turn). 1. A whirling or circular motion of any fluid, usually of water, forming a kind of cavity in the center of the circle, and in some instances drawing in water or absorbing other things; a whirlpool.

2. A whirling of the air; a whirlwind.

3. (*Cartesian system*.) A supposed collection of particles of very subtile matter, endowed with a rapid rotary motion around an axis. By means of these *vortices* Descartes attempted to account for the formation of the universe.



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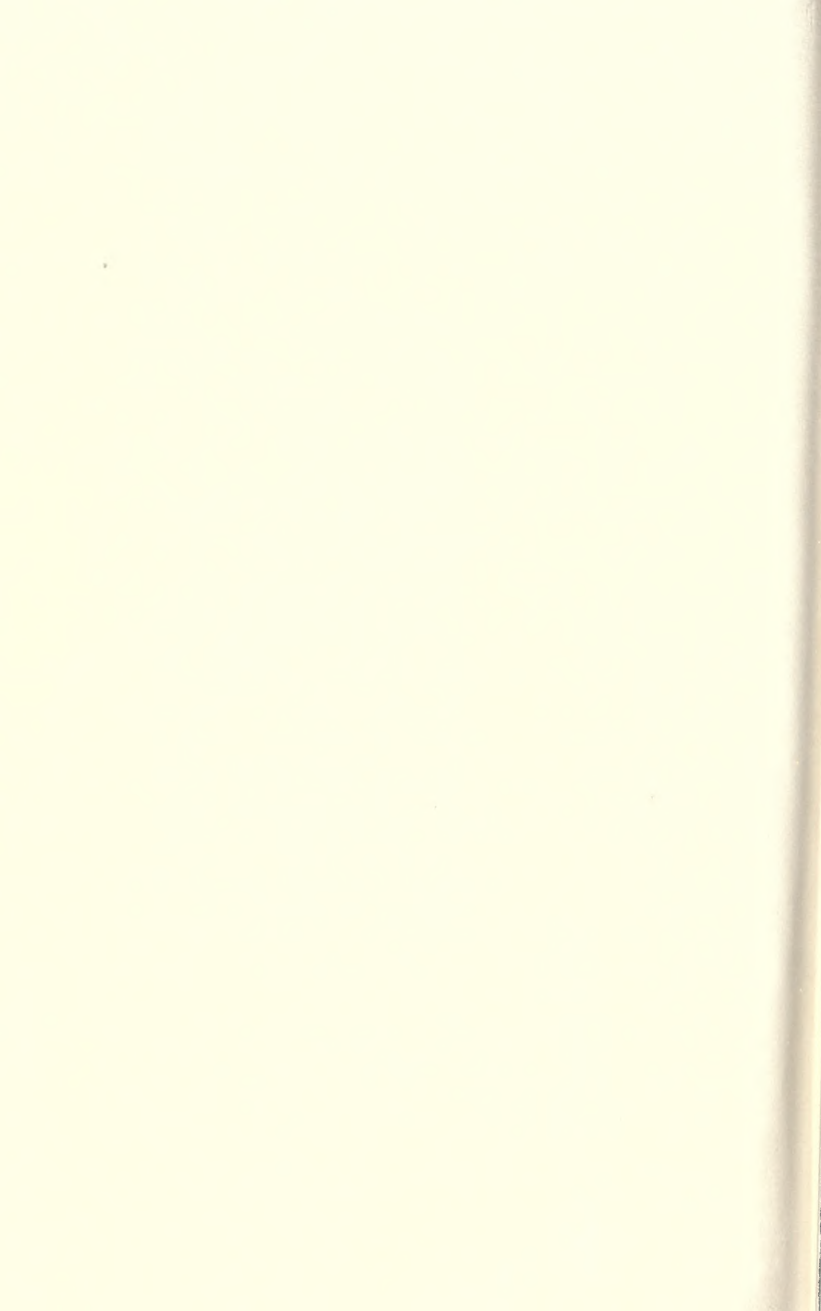
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